Digitized by Google

1204

BIBLIOTECA DELLA R. CASA
IN NAPOLI

N.° d'inventario H53 447
Sala Grande
Scansia H Palchetto 2
N.° d'ord. 33 38 2ª linea

Digitized by Google

IV. 2. 33.

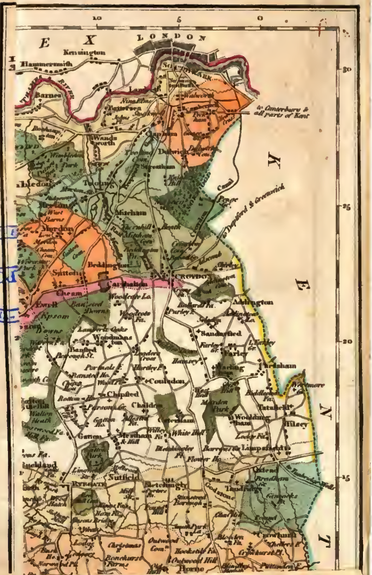
Pal. IV 46

Digitized by Google

Digitized by Google

Digitized by Google

RRY.



VITTORIO EMANUELE III
NAPOLI

Digitized by Google

847564

# GENERAL VIEW

OF THE

# AGRICULTURE

OF THE

# COUNTY OF SURREY.

DRAWN UP FOR

*THE BOARD OF AGRICULTURE*
AND INTERNAL IMPROVEMENT.

BY

WILLIAM STEVENSON.

VITTORIO EMANUELE III BIBLIOTECA NAZIONALE
NAPOLI

*LONDON:*
PRINTED FOR RICHARD PHILLIPS, BRIDGE STREET;
SOLD BY BLACK, PARRY, & KINGSBURY, LEADENHALL STREET;
J. G. RAYMOND, PALL MALL; WILMOTT & HILL, NO. 50, HIGH STREET, SOUTHWARK; RUSSELL, GUILDFORD; COOKE, GODALMING; STRANGE, KINGSTON; KNIGHT, WINDSOR; PARISH, EPSOM; NICHOL, FARNHAM; ALLINGHAM, REIGATE; & BY ALL OTHER BOOKSELLERS;
BY B. McMILLAN, BOW STREET, COVENT GARDEN.
1809.

[*Price Fifteen Shillings in Boards.*]

Digitized by Google

Digitized by Google

# ADVERTISEMENT.

THE desire that has been generally expressed, to have the AGRICULTURAL SURVEYS of the KINGDOM reprinted, with the additional Communications which have been received since the ORIGINAL REPORTS were circulated, has induced the BOARD OF AGRICULTURE to come to a resolution to reprint such as appear on the whole fit for publication.

It is proper at the same time to add, that the Board does not consider itself responsible for every statement contained in the Reports thus reprinted, and that it will thankfully acknowledge any additional information which may still be communicated.

N. B. *Letters to the Board, may be addressed to Sir* JOHN SINCLAIR, *Bart. M. P. the President, No.* 32, *Sackville-Street, Piccadilly, London.*

Digitized by Google

Digitized by Google

# CONTENTS.

## CHAP. I. GEOGRAPHICAL STATE AND CIRCUMSTANCES.

PAGE

SECT. 1. Situation and Extent, ........................ 1

2. Divisions, ............................ 3

1. The Hundred of Blackheath, ........ 5

2. The Hundred of Brixton, ............ 6

3. The Hundred of Chertsey and Godley, .. 7

4. The Hundred of Copthorn and Effingham, .................. 8

5. The Hundred of Croydon and Wallington, .................. 9

6. The Hundred of Dorking, .......... 10

7. The Hundred of Emley, or Elmbridge, 10

8. The Hundred of Farnham, .......... 11

9. The Hundred of Godalming, ........ 12

10. The Hundred of Kingston, .......... 13

11. The Hundred of Riegate, .......... 13

12. The Hundred of Tanridge, .......... 14

13. The Hundred of Woking, .......... 15

3. Climate, ............................ 17

4. Soil, ................................ 19

1. Clay, ........................ 24

2. Loam, ........................ 32

3. Chalk, ........................ 38

5. Minerals, .......................... 49

1. Iron Ore, ........................ 49

2. Fuller's-earth, .................. 50

3. Firestone, .................... 53

4. Limestone, .................... 55

6. Water, ............................ 59

## CHAP. II. STATE OF PROPERTY.

PAGE
SECT. 1. Estates and their Management, .......... 73
2. Tenures, .......................... 76

## CHAP. III. BUILDINGS.

SECT. 1. Houses of Proprietors, .................... 77
2. Farm Houses and Offices, ............... 78
3. Cottages, ............................... 82

## CHAP. IV. OCCUPATION.

SECT. 1. Size of Farms, ........................ 84
2. Farmers, ........................... 88
3. Rent, .................................. 91
4. Tithe, ................................ 92
5. Poor-rates, ............................ 96
6. Leases, ............................... 98
7. Expense and Profit, .................... 107

## CHAP. V. IMPLEMENTS.

SECT. 1. Ploughs, .............................. 116

CHAP. VI. ENCLOSING, ........ 142

CHAP. VII. ARABLE LAND, ...... 146

SECT. 1. Tillage, ............................. 147
2. Fallowing, ............................ 164
3. Course of Crops, ...................... 178
4. Wheat, ............................... 202
5. Rye, ................................. 221
6. Barley, .............................. 221
7. Oats, ................................ 226
8. Pease, ............................... 230
9. Beans, ............................... 233
10. Tares, ............................... 237

SECT.

PAGE
SECT. 11. Lentils, ........ 239
12. Buck-wheat, ........ 240
13. Turnips, ........ 242
14. Rape, ........ 266
15. Cabbages, ........ 269
16. Swedish Turnip, ........ 272
17. Siberian Turnips, ........ 278
18. Carrots, ........ 279
19. Parsnips, ........ 290
20. Potatoes, ........ 291
21. Clover, ........ 303
Red Clover, ........ 303
White Clover, ........ 309
Trefoil, ........ 310
Ray-grass, ........ 310
22. Sainfoin, ........ 311
23. Lucerne, ........ 323
24. Hops, ........ 325
25. Flax, ........ 374
26. Physical Plants, ........ 376
27. Woad, ........ 383

CHAP. VIII. GRASS LAND. ........ 385

SECT. 1. Meadows, ........ 389
2. Pastures, ........ 391
3. Laying Land in Grass, ........ 393
4. Breaking up Grass Land, ........ 407

## CHAP. IX. GARDENS AND ORCHARDS.

SECT. 1. Gardens, ........ 414
2. Orchards, ........ 419

CHAP. X. WOODS AND PLANTATIONS, 424

Copse Woods, ........ 426
Woods, ........ 436

PAGE
CHAP. XI. HEATHS, COMMONS, AND COMMON FIELDS, ............ 456
Heaths, ............................ 457
Commons, ........................ 460
Common-fields, .................... 470

CHAP. XII. IMPROVEMENTS.

SECT. 1. Draining, ............................ 483
2. Paring and Burning, .................... 488
3. Manuring, ............................ 494
4. Irrigation, ............................ 515

CHAP. XIII. LIVE STOCK.

SECT. 1. Cattle, ............................ 510
2. Sheep, ............................ 526
3. Horses, ............................ 536
4. Hogs, ............................ 537
5. Poultry, ............................ 538
6. Rabbits, ............................ 539

CHAP. XIV. RURAL ECONOMY.

SECT. 1. Labour, ............................ 540

CHAP. XV. POLITICAL ECONOMY.

SECT. 1. Roads, ............................ 546
2. Canals, ............................ 557
3. Fairs, ............................ 560
4. Manufactures, ........................ 563
5. The Poor, ............................ 567
6. Population, ........................ 570
CHAP. XVI. OBSTACLES TO IMPROVEMENT, 584
CHAP. XVII. MEANS OF IMPROVEMENT, .. 585

# AGRICULTURAL SURVEY

## OF THE

# COUNTY OF SURREY.

## CHAP. I.

## GEOGRAPHICAL STATE AND CIRCUMSTANCES.

### SECT. I.—SITUATION AND EXTENT.

THE county of Surrey is inland, and lies in the south-eastern part of the kingdom: it is bounded on the north by Middlesex, and a very small point of Buckinghamshire; on the west by Berkshire and Hampshire; on the south by Sussex; and on the east by Kent.

This county is divided from Middlesex and Buckinghamshire by the river Thames, which, from a little above Egham to near Deptford (the extremities of Surrey towards the north-east and north-west), runs a course of upwards of 50 miles. On the north-west Surrey joins Berkshire at Englefield-green, Bagshot, and Frimley. It touches Hampshire on the west and south-west, at Frimley-bridge, Aldershot, Farnham, and Hind-head: a branch of the river Loddon forms the natural boundary part of this way, viz. from near Farnham, where it rises, to Blackwater. Surrey joins Sussex on the south, at Shepherd's-grove; Felbridge-park, near East Grinstead; at the County Oak on Lovel-heath; about 31 miles from London, on the road to Brighton by Dorking; at Rudgwick; and about 44 miles from London, on the Haslemere road. It joins Kent at Rotherhithe, Garlick-hill, Norwood, Penge-common, Addington, Tatesfield, and Kent-hatch.

The north side of this county is very much indented by the river Thames: from Egham as far as Oatlands, this river flows in a south-east direction; from Oatlands to Kew, the line of its course forms nearly a right angle with the former part, with the exception of a considerable sweep which it takes between Moulsey and Kingston, to the south-east, so as to indent the county of Surrey at Thames Ditton. From Kew to a little below Battersea, its windings are not so great; and when it leaves the county, near Deptford, its course is almost exactly in the line in which it flowed when it entered it at Egham. The line of boundary between Surrey and Berkshire, and Hampshire, inclines to the west as far as Blackwater, where it strikes off, with an obtuse angle, in a south-east direction, nearly to Badshot: it then turns to the north-west, so as to take in Farnham; from whence it proceeds, with a small inclination to the east, till it reaches the borders of Sussex. The line of boundary on the Kent side is nearly straight, rather inclining to the east. On the Sussex quarter, the line is straight, with little or no inclination any way. The form of the county is a pretty regular oblong, except on the northern side, where, as has already been observed, it is deeply indented by the Thames.

Digitized by Google

In point of size, the county of Surrey ranks below most of the other counties of England; there being only 14 counties whose area is less extensive[*]. Its greatest length, from north to south, is about 26 miles; and its greatest breadth, from east to west, about 38 miles. Its area contains 811 square miles, or about 519,040 acres. By the returns made to Parliament in the year 1801, it appears there were at that time 47,586 houses in the county; of which, 1514 were uninhabited. The borough of Southwark contained nearly a fourth part of all the houses in the county, or 11,321: of this number, 388 were uninhabited. In the year 1727, it was computed that there were 34,218 houses in Surrey; so that the number of houses has increased, within these last 80 years, 13,368. This increase has probably been chiefly confined to the borough of Southwark, and the villages in the more immediate vicinity of the metropolis[†].

## SECT. II.—DIVISIONS.

This county is divided into thirteen hundreds, in which there are eleven market-towns, viz. Guildford, Croydon, Kingston, Farnham, Riegate, Dorking, Haslemere, Godalming, Epsom, Ewel, and Chertsey.

---

[*] These are, Bedford, Berks, Bucks, Cambridge, Herts, Hunts, Middlesex, Monmouth, Notts, Oxon, Rutland, Westmoreland, Worcester. Leicester comes nearest to Surrey in size, as it contains 816 square miles.

[†] Magna Britannia, vol. v. p. 327. In this work, Surrey is said to be 22 miles in breadth, and 112 in circumference; and to contain 592,000 acres of land. The latest and best authorities make the number of acres what I have stated them in the text, 519,040.

The Lent assizes are held at Kingston, and the summer assizes at Guildford and Croydon, alternately. The borough of Southwark is under the jurisdiction of the city of London; and, besides partaking of the commercial, manufacturing, and shipping business of the metropolis, it is particularly remarkable for the immense quantities of hops, wool, leather, and charcoal, which are exposed to sale in it.

The county of Surrey returns fourteen Members to Parliament, viz. two for the county itself, and two for each of the following boroughs: Blechingley, Gatton, Riegate, Southwark, Guildford, and Haslemere.

There are 140 parishes in Surrey, and 449 villages and hamlets.

Surrey is comprised in the archbishopric of Canterbury, in the diocese of Winchester, and in the archdeaconry of Surrey. There are three deanries in it, viz. Southwark, Stoke, and Ewel; 75 rectories, 35 vicarages, and 30 chapels and perpetual curacies*.

The thirteen hundreds are, 1. Blackheath; 2. Brixton; 3. Chertsey and Godley; 4. Copthorn and Effingham; 5. Croydon and Wallington; 6. Dorking and Wotton; 7. Emley, or Elmbridge; 8. Farnham; 9. Godalming; 10. Kingston; 11. Riegate; 12. Tanridge; 13. Woking†.

I. *The*

---

* Bacon's Liber Regis has been principally consulted.

† Surrey pays 18 parts of the land-tax. The hundreds pay as follows, at 4*s.* in the pound:

| | | | |
|---|---|---|---|
| Blackheath, - - - - | £.2981 | 18 | 4 |
| Brixton, East, - - - | 14,902 | 15 | 3 |
| ——— West, - - - | 4186 | 9 | 6 |
| Chertsey, - - - - | 3399 | 4 | 0 |
| Copthorn, - - - - | 2982 | 13 | 3 |
| Croydon, - - - - | 3745 | 11 | 4 |
| Carry forward, - - | £.32,198 | 11 | 8 |

Brought

## 1. *The Hundred of Blackheath.*

This hundred is bounded on the east by the hundred of Dorking; on the south, by the county of Sussex; on the west, by the hundred of Godalming; and on the north, by the hundred of Woking. There is no market-town in this hundred; but Godalming, Guildford, and Dorking, are conveniently situated for it. The whole of it lies in the deanry of Stoke. The following is a list of the principal villages, hamlets, &c. it contains, distinguishing the rectories from the vicarages.

Albury, or Aldbury. *Rectory.*
Alfold. *Ditto.*
Bramley. Chapel of ease to Shalford.
Chilworth. Hamlet, in the parish of St. Nicholas, Guildford.
Cranley. *Rectory.*
Dunsfold. *Ditto.*
Duttenham.
Ewhurst. *Rectory.*
Hascomb. *Ditto.*

---

| | | | |
|---|---|---|---|
| Brought forward, | £.32,198 | 11 | 8 |
| Dorking, | 2029 | 2 | 0 |
| Elmley, | 2020 | 19 | 0 |
| Farnham, | 1745 | 18 | 6 |
| Godalming, | 2628 | 6 | 5 |
| Kingston, | 3302 | 2 | 0 |
| Riegate, | 3772 | 14 | 6 |
| Tanridge, | 2821 | 15 | 0 |
| Woking, | 4066 | 12 | 11 |
| Southwark, | 11,546 | 18 | 6 |
| | £.66,133 | 0 | 6 |

St. Martha on the Hill.
Okewood. Chapel of ease to Wotton, Abinger, &c.
Shalford. *Vicarage.*
Shamley. Hamlet in Wornersh.
Shire. *Rectory.*
Sidney. Hamlet in Alfold.
Vachery. Hamlet in Shire.
Wornersh. *Vicarage.*

## 2. *The Hundred of Brixton.*

This hundred lies in the north-eastern part of the county: it is bounded on the east by Kent; on the south, by the hundred of Croydon; on the west, by the hundred of Kingston; and on the north, by the river Thames. It lies in the deanry of Southwark. The following are the towns, villages, &c. which it contains:

Barnes. *Rectory.*
Barne-Elms.
Battersea. *Vicarage.*
Battleham.
Bermondsey. *Rectory* *.
Camberwell. *Vicarage.*
Clapham. *Rectory.*
Dulwich. Hamlet to Camberwell.
Kennington. Manor.
Lambeth. *Rectory.*
Lambeth, South.

---

* This parish includes part of the manor of Hatcham; the other part lies in the parish of St. Paul's, Deptford. "Beyond Peckham, towards Greenwich, lies Hatcham, now a single house. It is a manor, partly in Kent and partly in Surrey."—*Lysons' Environs of London*, vol. i. p. 120.

Merton. Curacy.
Mortlake. Chapel.
Newington Butts. *Rectory.*
Peckham. Hamlet to Camberwell.
Penge-green.
Putney. *Rectory.*
Roehampton. Hamlet to Putney.
Rotherhithe. *Rectory.*
Shene, East. Hamlet to Mortlake.
Southwark. Borough.
Stockwell. Manor.
Streatham. *Rectory.*
Tooting-bec. Manor in Streatham.
Tooting Graveney. *Rectory.*
Walworth. Manor.
Wimbledon. *Rectory.*
Vauxhall. Manor.

### 3. *The Hundred of Chertsey and Godley.*

This hundred lies towards the north-west part of the county: it is bounded on the east by the river Thames, and the hundred of Elmbridge; on the south, by the hundred of Woking; on the west, by the same hundred, and part of Berkshire; on the north, where it runs out into an angle, by that county and the Thames. The Sheriff of the county has no jurisdiction within this hundred, but directs his writs to the Bailiff of it, who is appointed for life, by letters patent from the Exchequer.

The hundred of Chertsey is in the deanry of Stoke; it contains the following towns, villages, and hamlets:

Addlestone.
Bisley. *Rectory.*

Botley.
Byfleet. *Rectory.*
Chertsey. *Vicarage**.
Chobham. *Ditto.*
Egham. *Vicarage*†.
Frimley. Hamlet, in the parish of Ash.
Horshill. *Vicarage.*
Purford. *Rectory.*
Stroud.
Topworth.
Westley. *Rectory.*
Thorp. *Vicarage.*

### 4. *The Hundred of Copthorn and Effingham.*

This hundred lies nearly in the centre of the county, having the hundreds of Croydon and Riegate on the east; the hundred of Woking on the west; the hundreds of Emley-bridge and Croydon on the north; and the hundreds of Riegate and Dorking on the south. It lies in the deanry of Ewel, and contains the following places:

Ashted. *Rectory.*
Banstead. *Vicarage.*
Bookham, Great. *Ditto.*
———, Little. *Rectory.*
Chessington.
Cuddington. *Vicarage.*
Effingham. *Ditto.*
Epsom. *Ditto.*

---

* This parish, which is large, is divided into the tithings of Chertsey, Ham, Woodham, Alderstone, Lynne, Brocks, Bestles, and Lolworth.

† Egham is divided into four tithings, viz. Egham, Hythe, Endfield, and Strode.

Ewel. *Vicarage.*
Fetcham. *Rectory.*
Hedley. *Ditto.*
Horton.
Leatherhead. *Vicarage.*
Mickleham. *Rectory.*
Norbury.
Preston.
Smallfield.
Tadworth.
Walton on the Hill. *Rectory.*
Westhamble.

### 5. *The Hundred of Croydon and Wallington.*

This hundred is bounded on the north by the hundred of Brixton ; on the west, by the hundreds of Copthorn and Emley-bridge ; on the east, by Kent ; and on the south by the hundreds of Tanridge and Riegate. It lies in the deanry of Ewel, and contains the following places :

Addington. *Vicarage.*
Adscomb.
Beddington. *Rectory.*
Bensham,
Carshalton. *Vicarage.*
Chaldon. *Rectory.*
Cheam. *Ditto.*
Comb.
Coulsdon. *Rectory.*
Croydon, *Vicarage.*
Mitcham. *Ditto.*
Morden. *Rectory.*
Nonsuch.

Sandersted. *Rectory.*
Smitham. Hamlet to Coulsdon.
Shirley.
Sutton. *Rectory.*
Wadon.
Willey. Hamlet to Chaldon.
Woodmanstone. *Rectory.*
Woodside.
Wallington. Hamlet.

### 6. *The Hundred of Dorking, or Wotton.*

This hundred is bounded on the west by the hundred of Blackheath; on the south, by the county of Sussex; on the north, by the hundred of Copthorn; and on the east, by the hundred of Riegate. It lies in the deanry of Stoke, and contains the following places:

Abinger. *Rectory.*
Betchworth, Castle.
——— West.
Capel. *Curacy.*
Dorking. *Vicarage***.
Haw.
Ockley. *Rectory.*
Stone-street.
Wotton, Lower, *Rectory.*
——— Upper.

### 7. *The Hundred of Emley, or Elmbridge.*

This hundred is divided on the north from Middlesex by the river Thames: it is bounded on the east by the hundreds of Kingston and Croydon; on the south, by the hundred of Copthorn; and on the west, by the hundred of Chertsey. There is no market-town in it. It lies in the deanry of Ewel. The following are the principal places in it:

---

* In this parish there are five tithings, viz. West Betchworth, Homeborough, Chipping Milton, Westcott, and Dorking.

Cobham, Church. *Vicarage.*
——— Street. Hamlet.
Esher. *Rectory.*
Oatlands.
Oakshot. Hamlet to Stoke-Daubernon.
Moulsey, East. Chapel to Kingston.
——— West. Curacy.
Stoke-Daubernon. *Rectory.*
Walton upon Thames. *Vicarage.*
Weybridge. *Rectory.*

### 8. *The Hundred of Farnham.*

This hundred, which is the smallest in the county, lies on the utmost borders of it, towards the south-west: it is bounded on the east, and the south, by the hundred of Godalming; on the west, by the county of Hampshire; and on the north, by the hundred of Woking. It is in the deanry of Stoke, and contains the following places:

Badshot. Tithing of Farnham.
Chert. Tithing.
Elstead. Curacy.
Farnham. *Vicarage.*
Frensham. *Curacy.*
Poyle.
Runfold.
Runwick.
Seale. Curacy.

Tilford.
Tongham. Hamlet of Seale.
Waverley.
Wrecklesham. Tithing.

### 9. *The Hundred of Godalming.*

This hundred is bounded on the east by the hundred of Blackheath; on the south, by part of the county of Sussex; by that county, and the hundred of Farnham, on the west; and by the hundred of Woking on the north. There are two market-towns in this hundred—Godalming and Haslemere. It lies in the deanry of Stoke, and contains the following places:

Artington. Tithing.
Binscomb. Tithing of Godalming.
Burgate.
Cateshall. Tithing of Godalming.
Chiddingfold. *Rectory.*
Compton. *Ditto.*
Deans-hold.
Embhams.
Esking. Tithing of Godalming.
Enton.
Farncomb. Tithing of Godalming.
Godalming. *Vicarage.*
Hartmere. Tithing of Godalming.
Hambledon. *Vicarage.*
Haslemere. Chapel of ease to Chiddingfold.
Labourn. Tithing of Godalming.
Lathesley.
Milford.
Mousal.
Oxenford.

Pepper-harrow. *Rectory.*
Puttenham. *Ditto.*
Schackleford. Tithing of Godalming.
Shooland.
Thursley. Chapel of ease to Whitley
Whitley. *Vicarage.*

### 10. *The Hundred of Kingston.*

This hundred is bounded on the east by the hundred of Brixton; on the south, by the hundred of Elmbridge; on the north, by the river Thames; and on the west, by the same river, and the hundred of Elmbridge. It lies in the deanry of Ewel, and contains the following places, viz.:

Claygate. Tithing of Kingston.
Ditton, Long. *Rectory.*
——— Thames.
Ham.
Hatch. } Hamlets.
Hook.
Kew. Chapel.
Kingston. *Vicarage.*
Malden. *Ditto.*
Motdeane.
Petersham. Chapel to Kingston.
Richmond. Chapel of ease to Kingston.
Talworth. Tithing.

### 11. *The Hundred of Riegate.*

This hundred is bounded on the east by the hundred of Tanridge; on the south, by the county of Sussex; on the west, by the hundreds of Dorking and Copthorn; and on the north, by the hundred of Croydon.

It lies in the deanry of Ewel, and contains the following places:

Betchworth, East. *Vicarage.*
Brockham.
Buckland. *Rectory.*
Burstow. *Ditto.*
Chapel, New. Hamlet of Burstow.
Charlewood. *Rectory.*
Chepsted. *Ditto.*
Gatton. *Ditto.*
Gatwick.
Hookwood.
Horley. *Vicarage.*
Kingswood*.
Kinnersley.
Leigh†. Curacy.
Mestham. *Rectory.*
Newdigate. *Ditto.*
Nutfield. *Ditto.*
Riegate. *Vicarage.*
Shelwood.
Sidlum.
Stanton.
Wood-hatch.

### 12. *The Hundred of Tanridge.*

This hundred, which lies in the south-east part of the county, is bounded on the west by the hundreds of Riegate and Croydon; on the south, by the county of Sussex; on the north, it runs up into an angle between the county of Kent and the hundred of Croydon; and on the east, it is bounded by Kent. There is no market-town in it. It lies in the deanry of Ewel, and contains the following places :

---

* This is a liberty in the parish of Ewel.

† In the Liber Regis, Leigh is surveyed as a rectory.

Blechingley. Borough, *rectory.*
Blockfield.
Caterham. *Vicarage.*
Chelsham. Hamlet to Warlingham.
Crowhurst. *Vicarage.*
Farley. *Rectory.*
Godstone. *Vicarage.*
Golderhurd.
Hackstall.
Haresley.
Horne. *Vicarage.*
Lagham.
Limpsfield. *Rectory.*
Lingfield. *Curacy.*
Oxted. *Rectory.*
Smallfield.
Scarborough.
Tanridge. *Vicarage.*
Tatesfield. *Rectory.*
Titsey. *Ditto.*
Warlingham. *Vicarage.*
Woldingham.

### 13. *The Hundred of Woking.*

This hundred lies on the western side of the county, and is bounded on the east by the hundreds of Emleybridge and Copthorn ; on the south, by the hundreds of Godalming and Blackheath ; on the west, by the counties of Berkshire and Hampshire ; and on the north, by the hundred of Chertsey. It lies in the deanry of Stoke, and contains the following places:

Ash. *Rectory**.
Bagshot. Tithing in Windlesham.
Basington.
Bradley.
Burgham. Tithing.
Clandon, East. *Rectory*.
——— West. *Ditto*.
Crostock.
Guildford. Borough.
Horsley, East. *Rectory*.
——— West. *Ditto*.
Kenvil.
Mayford.
Meroe. *Rectory*.
Ockham. *Ditto*.
Perry-hill. Tithing.
Purbright. Curacy.
Ripley. Tithing of Send.
Staughton.
Stoke next Guildford. *Rectory*.
Sutton.
Titting.
Wanborough. Extra parochial.
West-end. Tithing.
Wick. Tithing.
Windlesham. *Rectory*.
Wisley.
Woking. *Vicarage*.
Warplesdon. *Rectory*.

---

* Ash is divided into three hamlets or tithings, viz. Ash, Normanby, and Frimley, in Chertsey hundred.

Google

## SECT. III.—CLIMATE.

*Prevalent Winds.*—The winds that blow with the most steadiness and constancy, and for by far the greatest part of the year, are the south-west and west. The wind seldom blows from any point of the compass between the north-west and the north-east, for any length of time. In the spring of the year, and frequently towards the end of autumn, the easterly winds prevail; and the weather is then cold and raw, with a drizzling moisture: but the greatest quantity of rain falls, when the wind blows from the S. S. W. or south.

I could not learn that the quantity of rain that falls on an average of years in this county, had been ascertained by any experiments, or that any rain-gauge was kept for that purpose. It seemed, however, to be the general opinion, that less rain falls in most parts of Surrey than in the metropolis, or in the vale of London; so that the climate of this county may be regarded as dry, so far as respects the quantity of rain merely: but the southern part of it, on the borders of Sussex, must, from the nature of its soil, the flatness of its surface, and the unventilated state in which it lies, from the immense number of trees with which it is covered, possess a moist and damp atmosphere.

From causes of a similar nature, the low parts of Surrey near the Thames, especially where the soil is strong, and the ground is liable to be overflowed, must be considered as rather moist and damp. On the other hand, the atmosphere on the chalk-hills, which stretch across the whole breadth of the county from the eastward of Croydon to Farnham, is dry, and rather keen. On the wide and exposed heaths, about Bagshot, Aldershot, surface, and sheltered, the snow lies longer, and the harvest is later, than on the adjoining vale lands. Perhaps the earliest part of the county is near Godalming, on the rich, dry, well-sheltered sandy loams.

The climate of Surrey is deemed very healthy in most parts of it between the Weald and the Thames, particularly near the northern foot of the chalk-hills: the dryness of the soil and climate in this part of it, and the entire freedom from the smoke of the metropolis, by the prevalence of the westerly winds, have deservedly given it this character.

## SECT. IV.—SOIL.

It is extremely difficult to give a precise and full account of the soils of any large extent of ground. In the first place, the terms used to designate the different kinds of soil, are so vague and loose, and have such different meanings attached to them by different people, that they either give no clear and accurate idea, or convey to many readers a different impression from that meant to be given. In the second place, the variety of soils that is often found within a very small compass, and the rapid and extreme change that often takes place, even in the same field, render it impossible to give a general idea of the soil of any extensive district. If each change and variety of soil is accurately marked and discriminated, the description of it in words must necessarily be tedious, confused and unprofitable; and the delineation of it on a map, would require a scale cumbersome and useless.

It has been the custom lately to object to the use of the term *clay*, as applied to denote any kind of cultivated soil; because, it is urged, no soil after it has been cultivated, that is, after it has been long exposed to the atmosphere, and mixed with manure, can properly be said to be purely argillaceous. There can be no doubt that, in the strict and chemical sense of the term *clay*, no soil which has been long under cultivation has a just claim to it; and probably clay, in this sense of it, is seldom found in a natural state, even where the plough has never touched the ground, and where no manure has ever been applied. But in speaking or writing on agricultural subjects, it is not expected, nor is it proper, that we should employ terms in any other than an agricultural sense. Farmers have long been in the habit of applying the word *clay* to a certain description of soil; and provided the word is confined exclusively to one description, well defined or described, it seems right to continue the use of the word, even though the chemist might tell the farmer, that the soil he denominated clay, had no proper and just claim to that denomination.

It must be acknowledged, however, that it is a difficult matter to affix a clear and precise meaning to the word *clay*, and at the same time to confine it strictly and exclusively to that meaning. The farmers of Norfolk and Suffolk apply the word *clay* to a kind of soil, which in other counties would be denominated loam: of course, unless these farmers, when they speak of clay, describe its appearance and qualities in a particular and clear manner, they will be apt to mislead their hearers. But here another difficulty occurs; for it is not easy to define the term in such a manner, as that it shall at the same time give a clear idea of what is meant by it, and not be applicable in some degree or respect to a loamy soil. It is easy to draw the line of distinction between *clay* and *sand;* but it is by no means an easy task to determine or point out what kinds of soil ought to be called loams, and what, on the other hand, ought to be called clays, or sands, as contradistinguished from loams.

This difficulty has been felt in describing two very different kinds of soil, that are found in great abundance in Surrey, viz. the soil that almost universally prevails to the south of the chalk-hills, on the borders of Sussex; and that which is found in less abundance, and more intermixed, in the north-eastern part of the county. By some, the former has been called loam, and the latter clay; while by others, the appellations have been reversed. There can be little doubt, however, that they are both clays, though they differ in many respects, and it may perhaps not be easy to determine which of them has the more just claim to the appellation, in the strict and chemical sense of the term.

Before proceeding to a description of the different kinds of soil that are to be found in Surrey, it is deemed proper to point out the most striking and distinguishing particulars, in which the clays of the south and of the north of Surrey differ from each other.

In the first place, there is a manifest and invariable difference between these two kinds of clays in their colour, both when they are wet and when they are dry. The clay of the *Weald*, or southern part of the county, has a pale and (if the expression may be allowed) a sickly appearance; whereas, the northern clays wear a browner and a healthier hue.

In the second place, the clay of the Weald, if it be ploughed wet or raw, is cut by the plough *like a piece of* *of soap*, and the furrow-slice turns over unbroken for a considerable length; but when an attempt is made to plough the northern clays in a similar state of moisture, they choke the plough; and the ground, instead of being turned over by it, rolls before it in a broken and muddy state. From this circumstance, the northern clays appear to be less adhesive than the clays of the Weald.

In the third place, in walking over the clay of the Weald, and the northern clays, the shoes are much more clogged with dirt by the latter than by the former, which are much more unctuous and slippery. This, at first sight, seems inconsistent with the preceding observation, and to prove, in opposition to it, that the northern clays are the most adhesive; but it should be remarked, that that adhesiveness, which is one of the most striking and peculiar marks of clay, is the adhesiveness of the parts of the clay to each other, not the adhesiveness of the clay to any other body. The soil of the Weald, in being unctuous or greasy to a greater degree, seems to possess a greater proportion of clay than the soil in the northern part of the county.

In the fourth place, the clay of the Weald is not affected by dry weather to such a degree as the northern clays: in the latter may be seen cracks, or rather rents, nearly a yard in depth, and several inches broad, in long-continued dry and sultry weather; but in the Weald, the ground does not contract nearly so much. I had a good opportunity this very dry summer (1807), of observing the different degrees in which the two kinds of clay were affected by the heat: while the northern clays were rent in all directions, there were to be seen but very few and very trifling cracks in the Weald of Surrey. This circumstance, however, may perhaps be more justly accounted for, from the situation of the Weald than from the nature of the soil: from the low situation of that part of Surrey, and the difficulty and slowness with which the ground there is dried, from the flatness of the surface, and the want of ventilation and sun (compared with the more open, elevated, and sloping ground in the north-east of the county), the moisture will be longer retained, and, of course, the contraction of the soil will be less—not because it is less pure clay, but because it is not nearly so dry.

In the last place, the action of the atmosphere on the clay of the Weald, proceeds much more slowly than it does on the northern clays. If some of the former, which has never before been exposed to the sun and air, be brought to the surface of the ground, it requires several years to produce even a slight change in its colour and qualities; and if it is wished to bring about this change in a shorter period, it is absolutely necessary to mix a considerable proportion of lime with the soil. But the unexposed clay of the north of the county differs little, even when it is first brought up to light, from the old soil: it is indeed of a different shade, and more hard in its contexture; but by being exposed to the atmosphere for a short time, it becomes exactly similar to the rest of the soil in colour and qualities.

On the whole, the clay of the Weald of Surrey must be regarded as more pure, and less mixed with vegetable matter, or with sand, than the clay in the other parts of the county. This opinion will be further confirmed by the fact, that it is much less fertile; for certainly, a pure clay cannot be friendly to vegetation.

Having thus endeavoured to illustrate the principal and most striking differences between these two kinds of clay, we shall proceed to point the particular parts of Surrey which have a soil of clay, loams, chalk, and peat.

### I. CLAY.

The pale and less fertile clay occupies nearly the whole of the Weald of Surrey. This district, which joins the Weald of Sussex and Kent, extends in its most southern part the whole breadth of Surrey, from Wilderwick to Haslemere, a distance of more than 30 miles. It contracts on the western side, as we proceed from Haslemere to Godalming; and about half way between these towns, it is deeply indented by the sandy loams. From near Hascomb to the northern boundary of the Weald, the breadth is not much more than 20 miles. The medial distance between the borders of Sussex and the northern limit of the Weald, is about four miles.

This is by far the most extensive tract of uniform soil in the county of Surrey; except on the northern side, where it rises towards the sandy loams, there is no difference to be perceived in the whole compass of it, except what evidently proceeds from peculiar situation. Its elevation in general is very trifling—less, it is said, than that of any other vale district in the island. Its surface, also, is very uniform: there are, indeed, a few spots raised above the general level of the Weald; and it is the soil of these rising grounds, which forms the only exception to the general soil of the district. The colour of the soil on the eminences is darker, and the quality more fertile; arising, in all probability, from the more dry and better ventilated state of the ground, and from the greater quantity of vegetable matter,

Google

matter, which would be produced and decay in such a situation, than in those which were more cold and less kindly.

The subsoil of the Weald lands is very retentive and cold: immediately below the depth to which the plough generally goes, it appears to consist of a *till*, or hard slaty earth mixed with iron. At a greater depth, a whitish clay is to be found, which has very much the appearance of pipe-clay; but on examination, it will discover the *schistose* or slaty texture. The *laminæ*, or plates, are extremely thin; and in the specimen which I more particularly examined, between Charlewood and Newdigate, they were easily compressed by the hand, so as to form a solid lump of clay. In some parts of the Weald, particularly towards the northern border of it, where the soil partakes more of the nature of a loam, ragstone is found as the prevalent subsoil.

From the account which has been given of the Weald of Surrey—of a cold retentive soil and subsoil; a low and flat surface, thickly covered with wood—it will easily be conceived, that the agricultural management requires both a large capital, and superior skill, attention, and activity, in order to be on the alert, and make the most of the proper seasons for the different agricultural operations of the year. Such a soil as it possesses, is easily rendered unfit for the plough by wet weather; and when once completely soaked with rain, it requires a very long course of dry and windy weather to restore it to its proper firmness; and even then, there is great danger that it will be left in a sour and unfertile state. It is not, indeed, so liable to root weeds as more open and friable soils; but if it once gets very foul, it requires more strength than is generally

Google

rally found upon it to clean it thoroughly, during the season when it can be worked with advantage.

Proceeding northwards, and omitting for the present the loamy soils, which are formed by the junction of the clay of the Weald and the sandy loams, and also the valley and hills of sand and sandy loams, which stretch nearly the whole breadth of the county between the chalk and the Weald—we come to a very narrow stripe of singular land. This is called in Surrey the "black-land," and is the same with what in Sussex and Kent is called "maam" soil. It is a very strong tenacious clay, of a blueish black colour, and a waxy nature: when it is completely dry, the blueish tinge increases; and in proportion as it becomes more wet, the black colour appears stronger, and less mixed. The line of this soil is not to be found to the west of Betchworth: none of it appears at the bottom of Box-hill; but as you proceed along the foot of the chalk-hills from this place towards Riegate, you find a regular and continued line of it, lying between the very foot of the chalk and the beginning of the sandy loams. It goes thus entirely through the county, and enters Kent, where it is said to terminate at Rochester. It follows every winding of the chalk-hills, and runs close up to them on the north side, and to the sandy loams on the south. The black-land seldom exceeds 300 yards in breadth, but in some places it is contained within a much narrower compass.

This is, no doubt, by far the most tenacious clay soil in Surrey, as it frequently requires seven or eight horses to plough it, when it is hardened by the dry weather: it is at the same time singularly fertile in wheat; and in seasons when it can be well and favourably worked, the produce of this grain per acre is perhaps

Digitized by Google

haps equal to what is reaped from any other soil in the kingdom.

With respect to the composition of this singular soil, there can be little doubt that it contains some calcareous matter; though not nearly so much as would naturally be imagined, from its lying immediately below steep hills of loose chalky rubble. Mr. Marshall found by analysis, that the "maam" soil of Duncton, near Petworth, in Sussex (at the immediate foot of the chalk-hills there), contained only seven and a half grains per cent. of calcareous matter; and from the great similarity in appearance, properties, and fertility of the "black-land," at the southern foot of the Surrey chalk-hills, and that at the northern foot of the South Downs, it is highly probable their analysis is very nearly the same.

The soil of the "black-land" is not only strong and tenacious, but it is also cold and retentive: this arises partly from the great depth to which it runs before the chalk is found, and partly from the rain-water and springs that sink through the neighbouring hills, and which are checked and retained when they reach the clay of the "black-land."

From the circumstance of this land lying in a very narrow line, it seldom happens that there are many acres of it in any one farm; of course, the proper mode of managing it is not so well understood, as if it formed the principal part of the farm. Beside the expense of working it, the necessity of leaving the other parts of the farm, in order to take it in a good season, and the peculiar fitness of it for pasture, have induced most farmers who possess any portion of it, to lay it down to grass.

The next kind of clay that appears in a northerly direction,

Digitized by Google

direction, lies on some parts of the flat surface of the Surrey Downs, towards the south side of them, and generally between the extensive heaths and the bare chalk of the rugged and steep precipice. In crossing from Ewel to Riegate, the nature of this soil is completely seen. On the flat of this broad part of the Downs, lies Walton-heath, a ferruginous unfertile sand, entirely free from chalk. After we cross the southern limit of this heath, and just before we come to the white cliffs which overlook the town of Riegate, the clay appears mixed with flints: its extent is not great, nor does it appear where the surface is sloping. The colour of it is dark red; and in tenacity, it does not seem to yield much to the black-land. It is probable, that there is chalk both under the heath and under this clay; as where the Downs are not so broad, more to the west, the chalk continues, without interruption or mixture, from the northern to the southern extremity. The flints that are found on the red clay just described, add to the probability that it at least lies on chalk; though the immediate subsoil differs in no respect from the upper soil, except so far as cultivation has rather changed the colour and loosened the texture of the latter. As this soil certainly lies far above the chalk, and differs essentially from what properly are called chalky soils, it was thought proper to notice it here, under the head of *clay*, rather than to place it under the head of *chalk*.

There remain now but two portions of clay soil that run to any great extent without mixture, or interruption by any other kind of soil: the first and most extensive, lies to the north of the narrow and steep ridge of chalk between Wanborough and Tongham. The length of this clayey district is about five miles, and the breadth about two miles and a half; running from the heathy lands to the north of Warplesdon, to Wanborough; and from near Stoke, below Guildford, to the borders of Hampshire, near Aldershot. The clay of this part of Surrey is strong and cold, lying in general low and flat: the quality of it appears to be superior to that of the Weald, but inferior to the clay in the north-eastern parts of the county. The subsoil, at least near Tongham, where I had an excellent opportunity of observing it, is a strong clay—some of it of a blueish white, and some of it of a deep red colour. This subsoil is dug for the purpose of making flower-pots, &c.: a mixture of the two kinds is esteemed best for that purpose. It is sold on the spot for 1*s*. 6*d*. the waggon-load, and made into pots at some of the neighbouring villages.

The other plot of clay runs from near Stoke Dabernon, through Chessington, Malden, and Morden: it is of the same quality as the other clays in the middle and north of the county, which will afterwards be mentioned; but is not, like them, intersected and broken by seams of sandy loam—at least, the clay in this district predominates to such a degree, that the variations from it may be passed over as trifling. The nature of this clay varies very little in the extent of country just mentioned. It may be considered in general as of considerable depth, since for several feet there is no difference in the soil, but what would soon and effectually be destroyed by exposure to the atmosphere.

In the north-east point of Surrey, in the line from Camberwell to Penge-common, through Peckham and Dulwich, the soil is in general a strong tenacious clay: the same soil stretches across towards Norbury-farm, intermixed, however, with lighter and drier ground, and on the eminences, approaching rather to a clayey loam.

The line of clay soil of the greatest length, with the exception of the Weald clay, but of trifling breadth, and frequently streaked with veins of sandy loam, and of sheer sand, is that which lies on the confines of the chalk towards the north. This line follows the chalk-hills, from their eastern boundary in this county to Guildford: after that, it expands into the broader and less mixed clay between Warplesdon and Ash, which has already been noticed. It is to be found a little to the north of Croydon, Beddington, Sutton, Cheam, Ewel, Epsom, Leatherhead, West Horsley, Clandon, and Meroe. In those parts which lie nearest the chalk, the intermixture of sandy loam and sand is more frequent and irregular: as we proceed northwards, the clay becomes purer and less mixed. Some of the villages, as Ewel and East Clandon, are placed on the immediate junction of this clay and the chalk; and the road from Ewel to Guildford, for the most part, runs very near it.

This clay is very strong and retentive; but at the same time, when labour is judiciously laid out upon it, it pays the farmer well. It is much superior in quality to the clay of the Weald, and even to the clay about Warplesdon and Ash, and may justly be regarded as a good wheat and bean soil. The clay about Dulwich, and about Malden and Chessington, is very similar to it.

Besides the tracts of clay already mentioned, this kind of soil is found in small quantity, and encompassed with loams of different strengths, in almost every part of Surrey, except the *vale* of sand between the chalk and the Weald; the heath in the west and south-

Digitized by Google

west parts of the county; the immediate vicinity of Farnham, and Stoke near Guildford; and the northern corner of the county, between Wandsworth and Byfleet. Even in the midst of the poor sands about Chobham and Onnersley, and on the richer sandy loams of Send and Cobham, there are fields of very strong clay to be found. This soil is also to be found amidst the lighter soils about Godstone and Oxted, especially on the southern side, and in some of the vallies of that chain of hills which runs between the chalk and the Weald. Parts also of the parishes of Merton, Streatham, and Tooting, have a clayey soil. The subsoil of these patches of clay must of course vary considerably: about Chobham, a ragstone is found below the cultivated soil; about Send, an earth evidently similar to the upper soil, except so far as the influence of the atmosphere and of cultivation produces a change. About Streatham and Merton, a flinty gravel is generally found below the clay.

The depth of the different clays in Surrey varies much: in the Weald, it is seldom possible to plough deeper than five or six inches without bringing up the *till*, or ferruginous subsoil: the clays about Malden, Chessington, &c. are considerably deeper—some of them, indeed, are several feet deep. It may in general be remarked on this head, that the richer and darker coloured the clay, the deeper it runs; since in this case, the under soil differs little from the cultivated soil, and may soon be brought into the same state, so that the farmer can deepen his upper soil without risque; whereas the farmer in the Weald is afraid to plough up that earth, which he knows will require years, and much labour, manure, and lime, to deprive it of its unfertile qualities.

Most of the fields of clay that are thus found intermixed with soils of a lighter kind, are of a good quality—little, if at all inferior, to the best soil of that description in the county. But there is a general prejudice against all clay soils in Surrey—a prejudice which appears to arise from two causes. In the first place, the most profitable description of farms are those which are favourable to a flock of sheep, and which, of course, have at least a certain proportion of turnip soil: to such farmers as have in view a flock, clay, therefore, is an unsuitable soil. In the second place, the expense and difficulty of working a clay soil, is so much greater than what are required on a drier and less tenacious soil; and in Surrey, the want of hands, and the cost of all kind of labour, are so severely felt, that the farmer prefers a saving in the management of his farm, to the payment of a lower rent. To these reasons must be added, that the crops from the best clays are much less certain, and are *said* to be generally inferior in quality to what are reaped from the loamy soils; and that the seasons when the former can be wrought with ease and advantage, are much shorter and more precarious.

### *II. LOAM.*

As this word is made to comprehend every variety of soil between a strong clay and a sheer sand, it is necessary, either to restrict its meaning to one limited and precise sense, and to give a clear definition of *that*, or to divide loams into different kinds. The latter is preferred, as less liable to misapprehension, and as taking in every thing that is necessary to be said in a more definite and comprehensive manner. The loams of

Digitized by Google

of Surrey may therefore be divided into, 1. strong loam; 2. less adhesive loam, or hazle loam; 3. calcareous loam; and 4. sandy loam.

1. *Strong Loam.*—This is to be met with between Guildford and Ripley, in greater extent, perhaps, than in any other part of the county. Towards the west it passes into a clay, and on the east it is joined to a gravelly sand. As we approach Ripley, the strong loam disappears, and is succeeded by a sandy soil. The subsoil in this tract is in some parts clay; in other parts, flinty gravel. Many of the meadows along the banks of the Thames, particularly the famous Runnymead, and the meadows near Kingston, may also be justly classed under the head of strong loams. This soil is also to be found, though not of quite so much tenacity, towards the foot of the southern side of the sand-hills that lie between the *vale* of sand and the Weald; stretching along from Leigh, by Woodhatch, to the south of Red-hill and Blechingley, towards Tanridge. The loamy soil here, however, is very much divided, and intermixed with sand and stiff clay. In some parts of the parishes in the north-eastern part of the county, about Streatham and Tooting, this soil is also to be found. The subsoil is various: below the loams that border on the Weald, sandstone, ragstone, and strong blue clay are found, principally as these soils lie more or less near the foot of the hills.

2. *Less adhesive Loam, or Hazle Loam.*—Beside the great extent of this most desirable soil which lies at the northern foot of the Downs, and which, as being calcareous, will be noticed hereafter, there are patches of it to be met with in different parts of the county, but

not of any great breadth. About Horshill, Woking, and between Street Cobham and Church Cobham, there are some hundred acres of this soil: the ground about Mortlake may perhaps also be classed under this head, unless it be considered as more properly a sandy loam, rendered rich and black by cultivation and manure. The same observation will apply to most of the land in that part of Surrey which runs up to the north, between Wandsworth and Kingston, and to the fields near Battersea: they may be classed under the head either of hazle loams, or of sandy loams—more strictly speaking, certainly under the latter. In proceeding from Guildford to Farnham, after we lose the ridge of chalk, and within a mile or a mile and a half of the latter town, a pretty extensive tract of hazle loam is to be found; extending by Badshot to the north as far as the corner of Hampshire, which there runs in; and on the south, nearly to Farnham-common. Some doubt may be entertained, whether the soil round Farnham is not strictly a calcareous loam; but as the chalk is not visibly mixed with the upper soil, nor lies immdiately below it, it may fairly be classed with the hazle loams. The depth of almost all the lighter loams is sufficiently great to admit of a furrow of eight or nine inches, without disturbing the subsoil, which in general is flints or gravel.

3. *Calcareous Loam.*—Along the northern skirts of the chalk-hills, there is a great quantity of this soil, extending from Croydon, with little interruption, very near to Guildford: as we approach this town, the soil becomes rather more light and sandy. Perhaps the richest tract of this soil lies between Croydon and Epsom, which may safely be reckoned among the best in

the county of Surrey: it is, indeed, the purest hazle loam, with the advantage of lying on a bed of chalk. The depth varies according to the elevation: near the limit of the chalk, it is very deep; as we ascend towards the Downs, the depth declines, till little more than three or four inches are left between the soil and the chalk rubble. Where the soil is deep, there is no drawback to its good qualities; but where it is shallow, and moreover pale and inclining to clay, it is observed that its lying on chalk keeps it backward in the spring. Loams on chalk, and calcareous soils in general, are found not to *burn*, or be *scorched*, even in the driest and most sultry seasons; and in this respect have the advantage of sandy loams, except these be very deep and rich.

Besides this calcareous loam, which lies on the northern skirt of the chalk-hills, another kind is found in those parts of the hills which are broken into vallies. This soil is not nearly of so brown a colour, nor so friable a texture, as the hazle loam: it is also much thinner, and much intermixed with flints. Indeed, it seems to lie between the loam and the clay—to be less friable and open than the calcareous loam, and much less tenacious and strong than the deep red clays, which have already been noticed as occupying the flats towards the southern side of the chalk-hills.

This soil occupies most of the country between Croydon and Godstone, and between the former place and Mestham; and is to be found, more or less, on all the sloping surfaces among the chalk-hills to the eastward of the Mole, and covers nearly the whole of them, where they contract into a single ridge, to the westward of that river. In many places, the surface is nearly concealed by flints; and the subsoil in general, in the vallies between Croydon and Godstone, is entirely composed of flints. Chalk rubble and chalk form the subsoil in other places, except towards the southern edge of the hills near Mestham, where the rubble of the celebrated firestone lies below the thin and pale loam.

It is probable that this kind of soil, if it had not been placed on a loose calcareous base, would have remained, what it certainly is independent of the mixture of chalk in it, a thin, tough, and cold clay; but by means of the loose chalk, which the plough has brought up, and broken and mixed with it, it is become a calcareous loam, still retaining however the cold, and in some degree the tough nature of the original clay.

4. *Sandy Loam.*—The best defined, and perhaps the most extensive tract of this description of soil, lies between the Weald and the Downs. It stretches across the county from the borders of Kent, near Limpsfield, by Godstone, Blechingley, Riegate, Dorking, Shire, and Albury, with a breadth seldom exceeding half a mile; till at Albury it expands, and stretching to the south, comes round by Wornersh, Bramley, Godalming, Mousel, Elsted, Pepper-harrow, and Seale. This extent of sandy loam varies in colour and in fertility: perhaps the richest part of it lies round Godalming. It is every where of great depth, and rests on a sandstone base, which hardens as it deepens. This sandstone is irregularly veined with an ore of iron; which, from the sand being washed out between the layers, appears like shelves, standing out from the sandstone, from six to eight inches: the thickness of this iron ore is generally about one inch and a half: the line in which it

Digitized by Google

it runs is slightly waving; and the lower surface of the ore is rather concave.

Sandy loam also predominates along the banks of the Thames, at Battersea, Wandsworth, Putney, Mortlake, Kew, and Richmond: here it extends to the south as far as Wimbledon. From the immense quantities of manure which this district receives, in order to fit it for the purposes to which it is chiefly applied, viz. the supply of the London market with vegetables, the soil, as has already been remarked, is become in general a black loam or rich mould. From Kingston, along the banks of the Thames, by Thames Ditton, Moulsey, Walton, Weybridge, Chertsey, Thorpe, and Egham, sandy loam is also found, though in many places intersected by passages of strong loam, and as we advance up the country, mixed with heathy and moorish soil. Returning to Kingston, we find this soil predominating on the road to Esher, Cobham, and Ripley, both on the right hand, after we have passed the commons, about Byfleet, Westley, Purford, and Woking; and on the left hand, about Ockham. This soil, though of an inferior quality, and appearing, along with some strong land, merely like spots, amidst the wild and desolate heaths, is to be found the whole way from the road between Kingston and Ripley, to the western limits of the county, on the borders of Berkshire and Hampshire. Besides these more extensive and important tracts of sandy loam, the soil about Stoke below Guildford; much of the soil in the parish of Beddington; and parts of the parishes of Barnes, and Tooting; the west side of the parish of Merton, and a narrow vein of ground in the parish of Sutton, between the chalk and the clay, are also sandy loam.

The subsoil of almost all the sandy loam to the north of the Downs is gravel; all of it of a flinty appearance and texture, and commonly deeply tinged with a yellow colour. The depth of the upper soil is various, generally more than a foot, but never nearly so great as that of the sandy loam to the south of the chalk-hills.

### *III. CHALK.*

This soil, where it was covered with loam, has already been noticed: the bare chalk, or chalk very slightly covered or mixed with earth, is entirely confined to the south side of the Downs: in many places, where the hill is very steep, the chalk rises completely to the surface, and exhibits, perhaps, more pure calcareous matter as soil, and especially as under tillage, than can be found in any other part of the kingdom.

There remains now only one kind of soil in Surrey to be noticed; this is the heathy or moorish soil, which unfortunately occupies a very large proportion of the county. A particular description of the principal heaths; the nature of their respective soils; and their aggregate as well as separate extent, will be noticed hereafter: we shall at present merely notice in what part of the county they chiefly lie, and the general character of their soil.

The whole of the south-west corner of Surrey, from Haslemere across to Farnham in one direction, and from near Elsted to Frensham on the other, is occupied by this barren soil. The soil of the west and the north-west part of the county is very little superior, but it is more relieved by spots of fertile ground. From the hill just above Egham to Bagshot; from Bagshot to Frimley; from Frimley, across Romping Downs, to

Ash, where the strong land begins—the whole, with little exception, is heath or moorish soil. The breadth of this heathy tract is also very extensive: in going from Bagshot, through Chobham and Byfleet, to Cobham, Ripley, and Oatlands, we pass across dreary and almost irreclaimable heaths; with here and there a distant glance of the loams about Horshill, and the stiff and retentive clays on the sloping ground about Ottershaw.

It is difficult to conceive a character of soil worse than that of the heaths of Surrey: it is a barren sand, soft, deaf and duffy, mixed with a hungry poor gravel, and with the remains of the decayed heath: it is very thin, lying on small stones of a dead white colour. Where the surface rises into a swell, the soil is rather better, supporting a stronger and more healthy heath. The soil is similar on that line of barren land which runs from Blackheath to Leith-hill, and which stretches across from the valley in which Albury stands, to the beginning of the Weald, near Ewhurst. Large tracts of heath are also found on the broad summit of the Surrey hills, of which we shall presently take more particular notice.

On the east side of the county, a heathy soil is found round Addington: this differs from the heaths in the west of the county, consisting almost entirely of loose round pebbles, or shingle, with a very small intermixture of earth, lying on a bed of white sand. This ground lies very high, and terminates, on the south-east, in steep headlands of a very singular appearance *.

From the full account now given, it will not be difficult to point out the respective soils of the different

---

* Lysons' Environs of London, vol. iv. p. 587.

parts of Surrey. The most striking and remarkable tract of land consists of the Downs, which stretch across the whole breadth of the county, with the exception of a mile or two near Farnham. They lie nearly in the middle of the county; entering from Kent into Surrey by Croydon and Tatesfield, and proceeding in a direction nearly due west, narrowing as they proceed, till they terminate about seven or eight miles beyond Guildford.

Near the eastern extremity, the width may be about seven miles; near the western, there is merely a narrow ridge, little more than the breadth of the turnpike road. Between Croydon and Godstone, between Ewel and Riegate, and between Ashted and Box-hill, the surface of the Downs is broken into vallies: to the westward of Leatherhead and Dorking, the surface is flatter and less broken; and the irregularity decreases as we proceed westward, and as the Downs become narrower.

A large extent of heath stretches along the high broad summit of the Downs, particularly about Walton and Hedley, which completely divides (at least for a considerable depth) the chalk of the northern compartment from the chalk of the southern compartment of the Downs: it is probable, however, that they join at their base. Some heath land, though of less extent, appears on the surface of the Downs, between the Mole and the Wey.

On the northern border, at least as far as Guildford, the Downs have a gentle slope, with the upper soil deepening as we approach their limits: on the southern side, the Downs are broken into rugged and precipitous cliffs, with an elevation, in many places, of at least 300 feet. Beyond Guildford, the angle of slope on the north and south side of the Downs is nearly the same—much

Digitized by Google

much greater than on the north side, about Epsom and Leatherhead; and much less than on the south side, about Dorking and Riegate. Fixing on the east part of the Downs as a point from which to set out, and proceeding to the southern border of the county, the first variation of soil we meet with, after reaching the bottom of the chalk-cliffs, is the narrow line of "black-land;" then the sandy loam in the valley; and as we cross the hills to enter the Weald, the sand gives way to clay, at first mixing with it, so as to form a loam, and afterwards disappearing entirely. The pale clay of the Weald, which now commences, accompanies us to the borders of Sussex. The same appearances, with a few variations, accompany us from whatever part of the Downs to the east of Box-hill we set out, in proceeding to the southern limit of the county. To the west of Box-hill, the "black-land" disappears, and the chalk and the sandy loam lie contiguous: the hills that lie between the sand and the Weald are also broader, and of a soil less fertile and cultivated.

Setting out from the chalk-hills near Guildford, and proceeding as usual towards the south, we find the sandy loam much more extensive, and meet with no soil that indicates the Weald, till we come near Hambledon and Hascombe. If we set out from the chalk-hill a few miles to the west of Guildford, we meet with a still greater breadth of sandy loam, which brings us no longer to the Weald, but to the heaths of Surrey. The point of the county which lies to the west of the extremity of the ridge of chalk, near Farnham, consists of a hazle loam.

If we set out again from the eastern extremity of the Downs, and proceed to the north, we find, as soon as ever we quit the chalk, a variety of soils, but principally strong clay, streaked with sandy loam; and these, with patches of gravel, continue till we come near Dulwich, from which place to the extremity of the county, near Rotherhithe, is a strong unmixed clay. If we set out farther to the west, from Bansted Downs, we meet a longer stretch of clay soil to the north of the chalk, by Sutton, Morden, and the east side of Merton, till we reach the gravelly loams of Putney-heath, and the sandy loams of Wimbledon and Mortlake. A similar line of soils, but with less extent of clay before we reach the sandy loams, prevails, if we set out from any point of the Downs between Bansted and Clandon; and the farther westward we proceed, the breadth of the clay soil that divides the chalk from the sandy loam, decreases in proportion.

From the northern borders of the clay to the river Thames, the soil in general is sandy, intermixed, however, especially on the banks of the Wey and the Mole, with loam of different qualities and strength, and with clay. The soil on the banks of the Thames consists partly of a sandy loam, and partly of a rich strong loam. If we proceed still further westward along the chalk-hills, and set out from Guildford, proceeding in a north-westerly direction, we first come to the sandy loams about Stoke; afterwards to strong retentive clays, which reach beyond Warplesdon, till they are bounded by the heathy district.

*Surface—General Appearance.*—The surface of almost the whole of Surrey, except the Weald, is gentle hill and dale. In some parts or it, the hills rise to a considerable height, and present very commanding and bold views. The north-west corner of the county, near the Thames, has its surface varied by Cooper's-

Digitized by Google

Cooper's-hill and St. Anne's-hill, both remarkable for the great extent and variety of country which can be seen from them. The description of the view from St. Anne's-hill (to which that from Cooper's-hill is very similar), we shall give from Mr. Skrine's Rivers of Great Britain.

"St. Anne's-hill starts up abruptly on the south-west of Chertsey. The lower parts of it are clothed with wood, but the ridge is almost level after it gets above the enclosures, presenting a delightfully verdant walk to the neighbourhood, and terminating in two venerable elms, where the descent is almost perpendicular into the plain. The prospect here is more happily marked than at Harrow, yet wonderfully extensive, except towards the south and west, where the bluff point of Cooper's-hill excludes the view of Windsor, and the bare ridges of Bagshot-heath circumscribe the horizon. On the east, the Surrey Downs appear well ranged behind the nearer heathy ridge of St. George's-hills, and with the eminences of Norwood, Sydenham, and the more distant summit of Shooter's-hill, in Kent, together with those of Highgate, Hampstead, Bushy, and Harrow, in Middlesex, form the outline of that immense plain, in which the dome of St. Paul's cathedral and the lofty pile of Westminster Abbey, enveloped in perpetual smoke, mark the proud position of the metropolis of England, surrounded by a numerous tribe of villages, and a most abundant population. The Thames here shews itself to great advantage, making a bold sweep to approach Chertsey-bridge, and intersecting the plain with its various meanders."—(P. 353, 354.)

The next eminence to the east, but at a greater distance from the Thames and St. Anne's-hill, is St.

George's-hill, of which, and the view from it, the same author gives the following description :

" St. George's-hill presents an oblong ridge in the midst of those wild commons which extend, with little intervals, from Walton and Weybridge almost to Bagshot, occupying in its range nearly the whole space from Weybridge to Cobham. It is of very considerable magnitude, running out into vast angles, which protrude themselves into the plain between deep hollows; and its summit is almost entirely level, being marked by a few clumps of firs at certain distances from each other, and adorned with turf-drives winding round the angles, which are understood to have been originally made by the Portmore family. They are curiously contrived, pervading every part of this ridge in circular mazes, so as to vary the scenery delightfully, and to present a charming airing to the vicinage.

" St. George's-hill is not only greatly larger, but considerably higher than that of St. Anne, though it rises so imperceptibly at first from the plain, that this circumstance does not immediately impress itself as you advance towards it. Its upper parts are more abrupt, and in some of the hollows almost perpendicular : when viewed from a distance, its elevation is most distinguishable, as all its protruding angles appear then united in one mass, stretching across the horizon, and differently featured from all the eminences of this country. The prospect it commands is almost unbounded over Middlesex, Buckinghamshire, Hertfordshire, Essex, and Kent, to the north and east; but Cooper's-hill and Bagshot-heath form a strong, though by no means a near, outline on the west, beyond which, towards the south, the ridge called the '*Hog's back*,' between Guildford and Farnham, terminates in a bold clump; and the points of the Hind-head hills, in Sussex, on the Portsmouth road, rise to view, piled on each other like Pelion over Ossa. From this clump above Guildford, the whole range of the Surrey Downs extends in a waving line, rising abruptly with the high-street of that county-town from the bridge over the Wey, which forms the intermediate valley, to a very considerable eminence. These bold summits create the southern boundary to St. George's-hill as far as Croydon, distinguished by various plantations, and a great number of fine parks and seats; beyond which, some distant parts of Kent close the prospect, as the eye in its circle approaches the east, one of which (near Sevenoaks) is crowned with the singular clump of the '*Knockholt Beeches*.'

"Richmond-hill, appearing to advance from the east beautifully towards the eye, clothed with thick groves, hides London from our view; but its attendant cloud denotes the position of the capital; and the two hills of Highgate and Hampstead appear in their usual bold display, as we pursue the circle towards the north gradually. Harrow on the Hill takes a prominent position in this level, backed by the ridges of Bushy-heath and Moor-park: westward again from the north, a very high and distant spot in Buckinghamshire is marked with a clump, planted by the late Lord Despenser, not far from Wycombe, and called Whittington-park. Few points in England command so extended an horizon; and the almost desert wildness which prevails on the west and the south, is singularly contrasted by the numerous towns, villages, and cultivated districts on each other side. Some of the nearer objects are peculiarly striking, among which, the majestic pile of Windsor-castle stands pre-eminent: the great

Digitized by Google

great mass of Hampton Court palace also makes a conspicuous figure, and the groves and shrubberies of St. Anne's-hill finely overhang the town of Chertsey. Below, the *Thames* winds in several bold sweeps through the meads which separate Shepperton from Weybridge, beneath the park of Lord Portmore, and the long extended plantations of Oatlands."—(Pp. 355—359.)

Proceeding down the Thames, the heights of Richmond, Putney, and Roehampton, attract the eye; and farther to the east, but at a greater distance from the river, the rising grounds about Norwood and Dulwich.

Across the middle of the county, the Downs, rising with a gentle slope from the north, and broken in their eastern division into deep and waving vallies, form a striking object, and give variety to the appearance of the county. Towards the northern border of the Downs, Sandersted-hill, near Croydon, affords a rich and majestic view; from it "is commanded the upper and principal part of the wide vale of London, closing with the well-featured grounds of Windsor, whose castle rises boldly and distinctly to the eye, though placed at near thirty miles distance*."

From the other part of the Downs, particularly from Box-hill, Bansted Downs, and Hedley-heath, the prospects are singularly commanding and rich. "As the country about Dorking is extremely mountainous, it presents you with a great variety of fine prospects, some of which are equalled but by few in England. To the north-east of the parish lies Box-hill, on the sides and summit of which grow the greatest quantities of box any where to be met with in the kingdom, interspersed

---

* Marshall's Southern Counties, ii. 396.

Digitized by Google

spersed with a number of little green spots and agreeable walks. The view from the highest part of this mountain, in a clear day, is very extensive, commanding a beautiful prospect, east and south, over part of the counties of Kent and Surrey, and the whole county of Sussex, quite to the South Downs, near the sea, at the distance of about 36 miles. The west and north views overlook a large part of Surrey and Middlesex; and as you advance to the place called the White, or Quarry, upon the ridge of the hill that runs towards Mickleham, the sublime and beautiful both join in forming a most grand and delightful scene. You here look down from a vast and almost perpendicular height, upon a well cultivated vale, laid out in beautiful enclosures, and see the river Mole winding along close to the bottom of the mountain, as if it were directly under your feet, though it is at a great distance. It is impossible for description to do justice to the amazing beauty of this enchanting spot*."

To the south of the Downs, the surface of the county rises in the hills that overhang the Weald, near Oxted, Godstone, Riegate, and Dorking: as we approach the western extremity of the county, these hills cover a greater breadth; and near Wornersh, Godalming, and Pepper-harrow, covered with a rich foliage, and waving with a graceful line into intermediate vallies, watered by the different branches of the Wey, they present the most picturesque prospect that Surrey can afford.

On Leith-hill, to the south-west of Dorking; Tilburster-hill, near Godstone; and Gratewood-hill, near Godalming, the views are very extensive. "To the south-west of Dorking, lies Leith-hill, remarkable for the amazing extent of country that, in a fine day, without the help of glasses, may be viewed from its summit. The whole counties of Surrey and Sussex, and great part of Hampshire, Berkshire, Oxfordshire, Buckinghamshire, Hertfordshire, Middlesex, Essex, and Kent, may be plainly seen; and if you are here about noon, in clear weather, you have a distinct view of the sea southward, at more than 30 miles distance; and northward, of the cupola of St. Paul's, and the still more distant hills about Brentwood, in Essex. The extent of horizon cleared by the whole prospect, is reckoned upwards of 240 miles; and this is demonstrable, if it be considered, that but few of the points of view are terminated at less than 30 miles, and most of them at 40 miles and upwards*."

---

* Natural History of Dorking, Gentleman's Magazine, May, 1763. This account gives a just idea of the extent of the prospect from this celebrated hill, but certainly does not afford a striking and full picture of the prospect.

Perhaps there is no part of the county in which the appearance of the rich-wooded vale of the Weald, backed by the waving line of the South Downs, is more strikingly pleasing, than in passing from Albury to Ewhurst. After toiling up the deep and barren sands that rise to the south of Albury, which present no object on which the eye can rest itself, even for a single moment—broken into hollows, which give only that variety which heightens the gloom and bleakness of the view—we come suddenly to the southern edge of the hill, from whence the whole extent of the Weald, clothed with wood, appears to the south, with an occasional peep of the sea through the breaks of the Sussex Downs, which form the back-ground: on the south-west, the rich and fine varied country about Godalming appears, backed by the wild heaths that stretch across from Farnham to Haslemere. Sometimes, in a clear night, the shadow of the moon is to be seen glancing on the waves of the English Channel, forming a singular and romantic feature in the prospect.

---

* Natural History of Dorking.

## SECT. V.—MINERALS.

The minerals in Surrey are, iron-ore, fullers'-earth, firestone, limestone, and chalk.

### *I. IRON-ORE.*

Considerable quantities of iron-ore are found in the south-west part of the county, about Haslemere, Dunsfold, and Cranley; and in the south-east part, about Lingfield and Horne. It is probable that this ore exists in considerable abundance in most parts of the Weald; but from the decline of the iron-works in Surrey, in consequence of the high price of fuel, it is not now an object to search for it.

Ragstone, containing some iron, is found in great abundance near the junction of the Weald and the chain of sand-hills to the south of Blechingley, Riegate, and Dorking; and also in smaller quantities about Send and Chobham. The ore of iron that appears in the sand about Puttenham and Godstone, and probably more or less in all the sand-hills between these two places—though tolerably pure, is in too small quantity to be worth the procuring.

### II. FULLERS'-EARTH.

There are great quantities of this useful earth found in Surrey, about Nutfield, Riegate, and Blechingley, to the south of the Downs; and some, but of inferior quality, near Sutton and Croydon, to the north of them. The most considerable pits are near Nutfield, between which place and Riegate, particularly on Red-hill, about a mile to the east of Riegate, it lies so near the surface, as frequently to be turned up by the wheels of the waggons.

The fullers'-earth to the north of the road between Red-hill and Nutfield, and about a quarter of a mile from the latter place, is very thin: the seam, in general, is thickest on the swell of the hill to the south of the road.

It is not known how long this earth has been dug in Surrey: the oldest pit now wrought is said to have lasted between 50 and 60 years; but it is fast wearing out. The seam of fullers'-earth dips in different directions: in the pit I particularly examined, it inclined to the west with a considerable angle. There are two kinds of it—the blue and the yellow; the former, on the eastern side of the pit, lay within a yard of the surface, being covered merely with the soil, a tough, wet, clayey loam: a few yards to the west, the blue kind appeared, with an irony sandstone of nearly two yards in thickness, between it and the soil. The blue earth in this pit is nearly 16 feet deep. In some places the yellow kind is found lying upon the blue. There seems, indeed, to be no regularity either in the position or inclination of the strata, where the fullers'-earth is found; nor, as far as I could learn, any mark by which its presence can be detected. It seems rather thrown in patches, than laid in any continued or regular vein.

In the midst of the fullers'-earth are often found large pieces of stone, of a yellow colour, translucent, and remarkably heavy, having many of the characters of sulphate of barytes*. The workmen carefully remove these stones from the fullers'-earth, as they say that they often spoil many tons of the latter which lie round about them. There is also found with the yellow fullers'-earth, a dark brown crust, which the workmen likewise consider as injurious.

The yellow and the blue earths are of different qualities, and are used for different purposes: the former, which is deemed the best, is employed in fulling the kerseymeres and finer cloths of Wiltshire and Gloucestershire; the blue is principally sent into Yorkshire, for the coarser cloths. The price at the pits for either kind, is 6*s*. the ton†. It is carried in waggons, each drawing from three to four tons, to the beginning of the iron railway, near Mestham, along which it is taken to the banks of the Thames, where it is sold at the different wharfs for about 25*s*. or 26*s*. per ton. It is hence shipped off, either to the North or West of England. A considerable quantity is also taken down into Wiltshire by the waggoners, especially when they happen not to have a full load of goods.

---

* Through the medium of a friend, I got a specimen of this stone analyzed by Mr. Allen, a chemist who is equalled by few in the zeal and success with which he prosecutes the science to which he is attached: according to him, the specific gravity is 4.440. It is, as I suspected, sulphate of barytes, encrusted on the surface with crystals of quartz.

† The price of fullers'-earth seems to have varied very little, at least, for these last 80 years. In the year 1730, the price of it at the pit was 4*d*. a sack, and 6*s*. a load; and in 1744, the price was nearly the same.

The workmen are paid at the rate of 2*s*. 6*d*. per ton: this includes the expense of clearing away the upper soil, as well as that of getting out the fullers'-earth. They can work on the *earth* only when the weather is dry: it is then weighed as it is dug out, by means of a rude scale suspended over that part of the pit where they happen to be working, on three or four poles, fastened together at the top, and spread out at their lower ends. The earth that is not immediately carted off by the waggons, is put under cover in an adjoining hut, in order to preserve it from the rain. During rainy weather, and after it, till the earth is pretty well dried, the workmen employ themselves in uncovering the upper soil. The sandstone that lies over the blue fullers'-earth, is broken into pieces—the better parts, of a size proper for building; the inferior, for the roads. Such as is sold for building brings 4*s*. 3*d*. the waggon-load; the remainder, 3*s*. 3*d*.: of these respective sums, the workmen get about one half. In the heart of the sandstone, pieces of petrified wood of considerable size, and sometimes of a very grotesque shape, are often found *. The workmen complain, that since the iron railway was brought to Mestham, the demand for fullers'-earth, though equally great, is not nearly so regular as it used to be. It is thought, that the demand for the Surrey fullers'-earth will be lessened, by the recent discovery of a pit of the yellow or better sort near Maidstone, in Kent. Fullers'-earth does not appear to impede or to hasten, to injure or to benefit, vegetation.

---

* A small piece of this was analyzed by Mr. Allen; he found the specific gravity of it to be 2.583, and that it consisted principally of carbonate of lime, which seems to have crystallized in the very substance of the mass: he found, also, a small quantity of carbonaceous matter still remaining, with a little oxyde of iron, and alumine; magnesia in small quantity, and a minute portion of sulphuric acid. If silex be present, it must be in very small quantity. No barytes was detected.

### III. FIRESTONE.

In the neighbourhood of Godstone, Gatton, Mestham, Riegate, and Blechingley, are large and extensive quarries of stone, of a peculiar quality. This stone, especially that which is dug out of the quarry near Mestham, at first is soft, and unable to bear the action of a damp atmosphere; after, however, being kept under cover for a few months, its texture becomes so compact, that it can resist the common heat of a house-fire: and in consequence of this property, it is in very general demand, in London and the neighbourhood, for fire-places. It is sold in London at about 1*s*. 6*d*. the cubic foot. The farmers in the neighbourhood are now also beginning to use it, to lay their kitchen-floors with; and if it is not put down before it is quite hardened, it will, if kept clean, make a very comfortable and neat floor.

On the White-hills, near Blechingley, the stone is rather of a different quality, and considerably more valuable. It is said to have been formerly much used by the chemists, bakers, and glass-houses; but is now principally employed by the last. It is much softer than the stone from the other quarries, but requires more skill and caution in working it. "It is of such a peculiarly fine quality for sustaining the utmost heat, that it is sought after by all the principal glass manufacturers in every part of the kingdom; large quantities being now shipped for Liverpool, and the North. It was principally owing to the powerful effects of this stone, which became known to Mr. Dawson, the original proprietor of the Vauxhall plate-glass works, that he was enabled to produce such amazing plates, as not only to give his glass a decided preference in England, but to astonish even the French themselves, from whom Mr. Dawson discovered the secret of manufacturing plate-glass in the garb of a day-labourer. Notwithstanding, however this stone is naturally possessed of such an incredible power, a great deal depends on the manner of building the furnace. Trial after trial has only served to prove, that the projectors knew but little of the business: Frenchmen have been sent for, but with as little success; and the Albion plate proprietors, like others of the same profession, after sinking immense sums in erecting works, must have given up the concern altogether, but for the very extraordinary abilities of Mr. Samuel Atkins, of Vauxhall, who was formerly a stone-mason, but who has retired from business. Possessed of great natural talents, quick in conception, and of extraordinary activity in execution, he traced out the art when a boy, and matured it into system in his riper years. I am informed, that those manufacturers who have employed him, can now make plates nearly one-third larger than they could before. These stones are fortunately procured of almost every dimension, some containing not less than 72 feet superficial, of ten inches thick: such stones are sold at *3s. 6d.* per foot, delivered in London: the more ordinary sizes at *3l. 10s.* to *4l.* per load of 102 feet *."

---

* Malcolm's Surrey, i, 48.

### IV. LIMESTONE.

Large quarries of limestone, affording lime equal in purity and strength, for building, to any in the kingdom, lie a little to the north-west of the town of Dorking. The stone is of a blueish grey colour, and contains a very small proportion of flint. The lime from this part of Surrey is in great demand in London, and the neighbourhood; and is particularly serviceable for the parts of such buildings as are to lie under water. The West India Docks, and those at Wapping, are built with it.

The best and purest limestone is said to be found at Denbighs, the seat of Mr. Dennison. In the quarry on his estate, the position of the strata is singular: in some parts they are nearly perpendicular; in others they incline considerably, forming a large angle with the former ones. This quarry is very large, and contains six kilns. There are other two quarries very near; and it is supposed the limestone stretches nearly a mile, and that the quarries are nearly in the middle of the vein. As much limestone is laid on each kiln as, when burnt, will yield 38 loads of lime, of 40 bushels each load. Only coals are employed: from three to four chaldrons are necessary to burn this quantity, according to the construction of the kiln, and the state of the weather: the time required is usually two days and a night.

Besides the quarries at Dorking, limestone is also dug and burnt at Guildford, Sutton, and Carshalton.

### V. CHALK.

As this is employed solely for the purposes of agriculture, either burnt, or made into lime; and as the kilns used for burning it are principally in the hands of the farmers themselves, the details respecting the chalk-quarries, and the mode of burning the chalk, will fall more properly to be considered under the head of *Manures*.

Coal is said to have been found formerly in different parts of Surrey, particularly in or near the parish of Cranley, and in the parish of Warplesdon. The following particular account of boring for coal in the latter parish, is given by the superstitious Aubrey, in his History of Surrey :

" Mr. Giles Thornborough, Rector of St. Nicholas and the Holy Trinity, at Guildford, one of His Majesty's chaplains, digging and boring after coal, in Slyfield-green, in this parish, found, 1st, of sand and gravel, seven feet depth ; then a spring : within a little of that, a bed of stones like square caps, and about two feet every way ; on the outside, whitish ; within, full of sulphur, out of which was extracted tinn, by Lander Smith, of London, engraver. These stones are called, at the coal-pitts at Newcastle, CATTS'-HEADS, lying always (they say) where coal is. The depth of this bed lay not above one yard. These catts'-heads are all full of small pipes for the mine to breathe through. Next, under them, lay a body of black clay (without any stone or mixture) for 15 fathoms ; then a rock of stone, about a yard thick, which was very hard ; then they came to black clay again for about three fathoms, and then another rock ; after that, clay mixed with minerals : then cockle-shells and periwinkle-shells, out of which Prince Rupert extracted tinn and other things, and some filled with clay ; after this sprung a bed of oker, 12 foot thick ; a kind of mother-of-pearl ; after that, a green quicksand. Then came coal, which, how deep it is, is unknown; for here the irons broke, thought by Mr. Lilly (astrologer) to be by the subterranean spirits; for as fast as the irons were put in, they would snap off. This is a kind of rocky coal (like that which they call kennel-coal), which burns like a candle.

"The inducement to Mr. Thornborough to be at this charge and search was, that there was a kind of stoney coal (that would burn), which he found by grubbing up the roots of an old oak in his grounds here.

"Fullers'-earth, like clay (which is mixed with brimstone), lay about 20 fathoms, and one or two yards thick*."

The sand about Tanridge, Dorking, and Riegate, is in considerable demand for hour-glasses, writing, and a variety of other purposes; and great quantities of it are carted to London. That about Riegate is said to be unequalled in the kingdom for purity and colour.

In Camden's time there were pits of jet, near Okewood. Aubrey makes no mention of this fossil in his History of the county; but Evelyn, in his letter to Aubrey, prefixed to his History, says, that in his time there were "pits of jeate, in the skirts of the parish of

---

* Aubrey's History of Surrey, vol. iii. p. 327. The use of coal for fuel seems to have been first introduced into the interior part of Surrey, at the time the Wey was made navigable from Weybridge to Guildford, towards the end of the seventeenth century: by this mode, however, the western part of the county alone could be supplied. In the beginning of the eighteenth century, "a way was found to carry up coal upon the Wandle to Croydon, where there is a great trade for them."—*Magna Britannia*, vol. v. p. 442. Edit. 1730.

Wotton, near Sussex." At present, there is no appearance of jet.

Brick-earth is found in many parts of the county, but the quality of it is inferior to that of Middlesex. It is either too strong, as near Camberwell and Dulwich; or too much mixed with flinty stones, which either vitrify, and spoil the colour and quality of the bricks; or when large, remaining entire, render the bricks apt to break: or the earth contains calcareous matter, which, after having been exposed to the fire of the clamps or kilns, prevents the bricks from resisting the action of a damp atmosphere for any length of time.

Besides in the more immediate neighbourhood of London, bricks are made at Cheam, Epsom, between Ripley and Guildford; near Cobham, Riegate, Wilderwick, and Wistley; and, indeed, more or less in most parts of the county. Near London, they are burnt in clamps; at a distance from it, where wood or furze is plenty and cheap, they are burnt in kilns. It is computed, that every 1000 bricks requires half a hundred faggots to burn them. A kiln of the usual size, viz. 13 feet long, 10½ feet deep, and 12 feet high, will hold 20,000 bricks.

At Nonsuch, in the parish of Cheam, is a very singular and valuable bed of brick-earth, from which bricks capable of resisting an intense heat, or fire-bricks, as they are called, are made. This kind of brick-earth is found close adjoining to the common brick-earth, from which it differs in being of a yellowish colour, and in evidently containing a greater proportion of sand. This kind of brick-earth has been long known and wrought: from the following account of Leland, it appears to have been used to make crucibles in his time. Speaking of Cuddington (the ancient name of Nonsuch), he says, "Crompton, of London, hath a close by Cuddington, in Southery, wher the King buildeth. In this close is a vaine of fine yerth, to make moldes for goldesmithes and casters of metale, that a loade of it is sold for a croune of gold. Like yerth is not found in all Englande *."

## SECT. VI.—WATER.

BESIDES the Thames, which washes the borders of Surrey, there are three rivers which flow the whole, or nearly the whole of their course, through this county; and two which rise near its borders, and afterwards enter other counties. The three first are, the Wey, the Mole, and the Wandle: the two last are, the Medway, and the Lodden.

The advantages which Surrey derives from the Thames, might be greatly increased and extended, provided the valuable meadows on its banks were regularly and intentionally watered by it. This, however, cannot be effected while they continue in commonalty; and though there can be no doubt that the overflowing of the Thames, even as it takes place at present, at various and uncertain seasons, and for an uncertain period of time, is of considerable utility to the adjoining meadow-land; yet this utility is not nearly so great, nor is it so unmixed with partial or accidental mis-

---

* Leland's Itinerary, quoted by Lysons, Environs of London, vol. i. p. 168.

chief, as it would be, provided the watering of the meadows were at the command of the farmers.

There is no doubt one great disadvantage attending the use of such a large and powerful stream as the Thames, for the purposes of irrigation: it cannot be so much under command, nor so easily managed and turned to benefit, as a smaller stream; but on the other hand, the supply of water is always sufficiently great, and none of the evils attending small streams that are covered with mills, are to be apprehended.

The principal branches of the Wey rise in the heaths, on the borders of Hampshire and Surrey. One of these enters the county of Surrey near Frensham; another enters at Farnham, where it forms a pleasant vale. These two uniting, flow on to Elsted, where they are joined by a third branch, which takes its rise near Thursley. After the junction of these three streams, the Wey, now a considerable river, flows nearly in an easterly direction, by Pepper-harrow to Godalming: at this place it turns to the northward, with a little inclination to the east, and divides the chalk-ridge at Guildford. Another considerable branch of the Wey rises not far from Abinger; and running by Wotton, Shire, and Albury, it unites with the main stream near Shalford. From Guildford it passes through Stoke, Send, and Woking, near which last place it receives a stream that rises near Ash, and flows by Warplesdon. From Woking it runs by the village of Byfleet, and falls into the Thames at Ham Haw, near Weybridge. Just before it falls into the Thames, it is joined by a small stream, which, rising near Bishley-common, passes by Bishley and Chobham, and "beneath a waving ridge, covered with the plantations and fine seats

Digitized by Google

seats of Ottershaw and Botleys, and surrounded by wild heaths, in the centre of which that great expanse of water, called the *Shire Pond*, swells almost into the dignity of a lake*."

The waters of this river often bring down large quantities of sand, especially in the former part of its course: this is occasioned by the steep hills of sand near Godalming, the soil of which is washed down by every heavy shower into the Wey, which flows below them. In consequence of this, the meadows near Godalming are not nearly so valuable as they otherwise would be. Streams which bring down sand, are not only not so fertilizing as those which flow through a calcareous soil, but they are absolutely injurious, by the quantities of sand which they deposit on the adjacent low grounds; since both the hay and the pasture are thus much damaged. Nor is this disadvantage, arising from the sandy country through which the Wey flows in the beginning of its course, entirely removed by its afterwards passing through a calcareous soil. The breadth of the chalk-hills, at the spot where it crosses them, is so very small, that it can receive but little calcareous matter; so that even if it had not been previously passing through a sandy country, its waters could not have been so very fertilizing as those of the other streams in Surrey which flow further to the east, where the chalk-hills are much broader. Whether, however, the quality of its water differs from that of the Mole, merely because the latter receives a greater quantity of calcareous matter in its course, or because the Wey receives such a large quantity of sand near Godalming, there is no doubt that the former, through the whole of its course, is much more beneficial to the meadows it overflows than the latter is. The meadows of the Wey, even near its exit into the Thames, have the character of giving the rot to sheep, while those of the Mole are esteemed perfectly sound [*].

---

* Skrine's Rivers of Great Britain, p. 361.

" The MOLE of Surrey brings a considerable accession of waters to the Thames, opposite to Hampton Court, and is the one of its auxiliary streams which most merits a specific description, being more like the rivers that are produced in mountainous districts than those which pervade the central plains of England [†]. The *Mole* rises in the forest of Tilgate, just within the borders of Sussex, pursuing first a northern direction, and then inclining westward to Dorking, northward again to Leatherhead, after which it makes a considerable compass by the west to the north, to encompass Cobham. Though the course of this river is short, its windings are

---

[*] The canal formed by means of the Wey, from Godalming to Guildford, and thence to the Thames, will be considered afterwards under its proper division.

[†] Mr. Marshall, in his remarks on the *Waters* of the Wea'd of Surrey and Sussex, observes: " In this respect the extensive flat under view is remarkably circumstanced. Lands of a similar description, lying between lofty ridges of high grounds, are generally accompanied by a river, bearing some proportionate size, to the extent of the vale and the height of the hills that define it. Whereas the vale lands under view, instead of giving passage to waters collected on higher grounds, may be said to give rise themselves, low lying as they are, to three rivers, whose branches at least, have their origin within its area: namely, the MOLE (and perhaps some slender branches of the Wey), which falls northward to the Thames, and the Arun and Adur, which direct their courses southward to the English Channel; the former collecting its waters chiefly within the limits of Surrey, the latter within those of Sussex: the division of the counties being near the turn of the water, which, however, is given by so gentle a rising, as to be imperceptible to the eye."—*Marshall's Southern Counties*, ii. 95.

very

Digitized by Google

very numerous, and it has the peculiar attribute of burying itself in many places under ground, and after pursuing a subterraneous course for some miles, bursting again into sight. The spots where this incident takes place bear the denomination of "*the Swallows*;" and from hence *the Mole* seems to have obtained its name. It flows at first through a flat and rather uninteresting country, till it approaches that great barrier of downs which extends through the whole of this part of Surrey, proudly overlooking the wooded flat of Sussex. *The Mole* passing beneath the venerable groves and avenues of Betchworth-castle, enters into one of these defiles near Dorking, where it is joined by another stream issuing from between the Guildford Downs and the heathy hills bordering upon Sussex in the west, and passing between the park of Sir Frederick Evelyn and the plantations of Mr. Lomax. It then forms a most romantic valley beneath the almost perpendicular height of Box-hill (an eminence extraordinarily covered throughout with that shrub which here grows to the dignity of a tree), nor can a more delightful scene in nature be described, than this narrow stripe of beauty between two downish ranges, receiving a profusion of ornament from the magnificent villas which decorate it with their structures and their rich plantations. Dorking appears to great advantage from the high hill on which Denbighs, the seat of Mr. Dennison, stands exalted, and Mr. Lock's fine modern house of Norbury crowns the summit of his beautifully wooded park, which descending in fine shelving hollows overspread with evergreens, overlooks the whole valley to Box-hill, with the pleasant village of Mickleham and the town of Dorking below, backed by the bold elevation of the Leith-hills on the border of Sussex. At Leatherhead the *Mole* makes its exit from the hills, and winding through a range of commons by Stoke, the old seat of Sir Francis Vincent, almost encircles the village and shingled spire of Cobham, as it winds through the enchanting territory of Pain's-hill. This justly celebrated place was entirely the creation of the late Hon. Mr. Hamilton, who rescued it from a rude uninteresting common, and embellished it with every successful effort of taste and judgment. Thick plantations cover all the steep banks which incline to the *Mole*, fine lawns are formed between them, and the central hollow of these extensive grounds is floated by a considerable lake. The buildings are not numerous, but well designed and happily placed, and the Temple of Bacchus in particular is a splendid room. A very considerable house was added by Mr. Bond Hopkins, the late proprietor, overlooking *the Mole*, and the village of Cobham, opposite to the late Lord Ligonier's Italian edifice of Cobham-park. *The Mole* is here crossed by two long bridges, after which it winds through a plain intersected by large commons to Esher, leaving Burwood-park, the seat of Sir John Frederick, on the left, and Claremont on the right, where the superb mansion erected by the late Lord Clive occupies a high eminence in the midst of its extensive and well wooded park. Esher Place, built by Wolsey, but in later ages the favourite spot

"Where Kent and Nature vied for Pelham's love,"

stands on a gentle elevation above *the Mole*, under two finely planted hills, which form its park, and distinguish this part of the country from afar in every direction. All the beauty of the Mole ceases at Esher; from whence that once charming river winds in unobserved sluggishness through an uninteresting flat, to the villages

Digitized by Google

of West and East Moulsey, losing all the spirit of its original character, till the Thames opens to receive it opposite to Hampton Court*."

As the circumstance of the Mole's burying itself under ground is much misrepresented or misunderstood, and as Mr. Skrine, in the preceding account, appears to fall in with the common and popular opinion, it may be worth while to state the evidence of those, who from the opportunities they possessed, by living long near the spot where the Mole is said to disappear, and from the care they took to ascertain the real fact, are the most credible witnesses on this curious point.

The author of the Natural History of Dorking (which has been already quoted) describes and accounts for the fact in the following manner: "The Mole enters the parish of Dorking on the east side, near Betchworth-castle, and running in a very deep channel along the foot of Box-hill, goes out on the north side into the parish of Mickleham. It takes its name from its working itself under ground, and this it does first about Box-hill, where it sinks into the earth by a great number of subterraneous passages called *swallows*, and not, as some have imagined, by losing itself all at once; for according as you meet with these swallows, which are on both sides of the stream, you see plainly, when the river is not too much swelled by rains, the diminution of its usual current; and this is so visible in a dry time, that in many places between Box-hill and Leatherhead the channel is left quite dry. There are two places, one at Burford-bridge, near Box-hill, and the other at the north end of Mickleham Street, at Lady

---

* Skrine's Rivers of Great Britain, 371.

Tryon's park gate, that during the last summer (1762) were often left entirely dry. I mention only these two, because they are both in view of every person that travels the turnpike-road from Leatherhead to Dorking. Those who would see in what manner the river loses itself in these subterranean passages, may, where the passages are at the side of the stream, and not at the bottom, be easily satisfied by stopping the inlet of the river, which I have seen done, at a very large *swallow* on Box-hill side, at a place called the *Way Pole*, a small distance from the turnpike gate. The water has there formed a large kind of bason, nearly circular, about thirty feet in diameter, which is supplied, when the current is at its ordinary height, by an inlet from the river of two feet broad, and eight or nine inches deep; which inlet being dammed with a hurdle, and dirt, &c. thrown up against it, the water in the bason will soon be observed to sink, and in less than an hour be quite drained off, and the chasms, or passages, which are very irregular, and at different depths from the surface of the bason, may be seen."

This statement gives a more clear and credible account of the partial disappearance of the Mole, than the loose and general terms used by those who represent it as sinking altogether, and passing for a considerable length of its course under ground. The following account from Manning's History of Surrey, enters more into the detail of the cause, and, when connected with the preceding, may justly be regarded as exhibiting the true state of the case. After quoting Cambden's statement, Mr. Manning adds: " From this fabulous account, plainly founded on an idea suggested by common report, a reader might be led to imagine that the river actually disappears at this place (Box-hill), forms a channel

Digitized by Google

channel beneath the surface of the earth, and at a certain distance rises again, and pursues its course above ground. But the truth of the matter seems to be this. The soil, as well under the bed of the river as beneath the surface on each side, being of a spongy and porous texture, and by degrees probably become formed into caverns of different dimensions, admits, through certain passages in the banks and bottom, the water of the river. In ordinary seasons, these receptacles being full, as not discharging their contents faster than they are supplied by the river, the water of the river does not subside, and the stream suffers no diminution. But in times of drought, the water within these caverns being gradually absorbed, that of the river is drawn off into them; and in proportion to the degree of drought, the stream is diminished. In very dry seasons, the current is in certain places (particularly at Burford-bridge, near Box-hill, and a little lower, between that and Norbury park-gate, and at that gate and Norbury meadows) entirely exhausted, and the channel remains dry [*except here and there a standing pool. By the bridge at Thorncroft it rises again in a strong spring, and after that the current is constant*]*."

It has already been observed, that the waters of the Mole are of a much more fertilizing quality than those of the Wey: they are not, however, turned to so much account as they might be, in those places where the position and surface of the adjoining grounds would admit of irrigation.

---

* Manning's History of Surrey, vol. i. p. 3. Introduction. The latter part of this account, inclosed in brackets and marked with asterisks, the editor of Manning received "from the information of Mr. Robinson, a very intelligent surveyor, long resident at Riegate."

The river *Wandle*, or *Vandal*, differs in its origin and character from the Wey and the Mole: they rise and collect the principal part of their waters before they enter the chalky district of Surrey, and their streams, especially that of the Wey, are frequently rendered impure and turbid by the clayey or sandy nature of the soil through which they flow. The Wandle, on the other hand, collects all its waters in the very heart or on the borders of the chalky districts, and almost constantly exhibits a clear stream.

This river takes its rise a little to the south of Croydon, and flowing by Waddon and Beddington, is greatly increased by some very powerful and constant springs which rise at Carshalton; from this place the Wandle runs by Wallington, Mitcham, Morden, Merton, Tooting, and Wandsworth, at which last place it enters the Thames. In this course of rather more than ten miles, it turns nearly forty mills of different kinds (which, with the mills turned by the other rivers, will be particularly noticed under the article *Manufactures)*, and is said to furnish employment for near 2000 people.

Besides these streams, which flow through the whole or nearly the whole of their course, in the county of Surrey, and which, from their size, are denominated rivers, and have a fixed and peculiar name given to them, there are several brooks which run into the Thames. Of these, the two most worthy of notice are a small stream, which rising near Bagshot, on the western side of the county, and passing through the hundred of Chertsey, falls into the Thames between Egham and Cowey Stakes; and a stream of remarkable purity and clearness, which is formed in the town of Ewel by several springs, and after turning a considerable number of mills, among which the most noted are the powder-mills at Malden, falls into the Thames at Kingston. This stream is sometimes called Hogg's Mill river, and sometimes the Ewel river: its fall from Ewel to the Thames is 72 feet.

While the high and precipitous chalk-ridge on the south, just above the valley of sandy loam, gives out merely the rain-water which it has absorbed; the sloping north side of the same ridge, and the vallies into which it is broken at its eastern extremity, discharge periodically copious streams of water, provincially denominated "bourns *." This striking difference between the southern and northern sides of the chalk-ridge, is ingeniously accounted for by Mr. Marshall, on the supposition that the base and retaining strata, as well as the surfaces of the hills, incline the same way.

A considerable branch of the *Medway* rises in the parishes of Godstone and Horne, in the south-eastern division of the county: this branch runs by Fellbridge-park, crosses the turnpike-road which leads from London to Lewes, and flowing through the parish of Lingfield, leaves the county of Surrey, and enters into Kent.

Another branch of the same river rises in the parish of Godstone, adjoining the town; and after flowing through Crowhurst, and joining a third stream, which rises near Oxted, and flows by Tandridge, it unites with

---

* One of the most remarkable of these "bourns," or periodical springs, rises between Caterham and Couldon, in the low ground, commonly called Stoneham-lane: this "bourn," at its overflowings, runs down in *Smitham-bottom* to Croydon, where it forms, in a great measure, the river Wandle. There is another "bourn" in the manor of Westhall, in the parish of Warlingham.

the first and principal branch near the extremity of the parish of Lingfield.

The river *Loddon* has been already mentioned, as skirting the county on its western side: its direction is nearly north-west by Frimley, till it leaves Surrey. Its waters are employed to supply the Basingstoke Canal.

*Ponds.*—In the western parts of the county, particularly on the wide and desolate heaths, are several very large and extensive ponds, which appear to have been used for nearly two centuries in keeping and feeding carp, and other fish, for the London market. Shire Pond, between Chobham and Byfleet, and one near Frensham, containing about 150 acres, are among the most extensive. In the south-eastern parts of the county, also, particularly near Godstone, there are ponds, though not so large as those on the heaths, employed for the same purpose of feeding fish for the London market*.

*Springs.*—In noticing the rivulets, we have already stated, that on the northern side of the chalk-hills, and in the vallies that lie near their eastern extremity, there are several springs of pure water: nor is the rest of the county ill supplied with springs. With respect to wells, it is often found necessary to bore to the depth of 300 feet, before a regular and sufficient supply of water can be procured: this is the case principally on the chalk. At Effingham-hall, there is a well upwards of 300 feet deep, entirely through chalk: this, indeed, is

---

* Some particulars respecting the management of these ponds, and their produce, will be given afterwards.

Digitized by Google

nearly the depth of most of the wells that are dug near the summit of the chalk-ridge. Even off the chalk, it is sometimes found necessary to go to a great depth for water: at Balham, Brixton-causeway, &c. there are wells 200 feet deep, running almost the whole way through a bed of oyster-shells, cemented by clay, &c. On the top of Norwood-common there is a bed of clay, upwards of 300 feet thick, which it was necessary to cut through, before the water would rise to the top of the well freely and regularly.

The *mineral waters* of this county were formerly in high repute, and some of them were much frequented; but latterly they have lost their reputation—partly, perhaps, from their virtues having been misunderstood, or over-rated; but principally, no doubt, from a change in fashion or opinion, which regulate these matters more than truth or experience.

The mineral waters in Surrey are those at Epsom, Cobham, Streatham; the Dog and Duck, in St. George's-fields; Jessop's-wells, Comb-hill, near Kingston; Dulwich; the Iron Pear-tree, near Godstone; Warplesdon, Newdigate, Frensham, Witley; Meg's-well, near Dorking, &c. Of the principal of these, we shall give a short account.

*Epsom* mineral water is reported to have been first discovered about the year 1618, by one Henry Wilker, who, in a dry summer, observing water in a small hole, cleared it out with his paddle, and the next day finding it full of clear water, brought his cattle to it; they, however, refused to drink it, which led him to suspect that there was something peculiar in it: this was confirmed on his tasting it. At first, it was used only externally for sores; but about 1630, its purgative qualities were discovered. The hill where the wells are, is of a grey-coloured earth. The water is limpid, with a slight saline taste: the principal component part is sulphate of magnesia, or what is usually termed Epsom-salts; there is also a little carbonate of lime. Formerly this water was used, not only for drinking, but also for the purpose of preparing Epsom-salts; but latterly, these salts are made almost entirely from sea-water, particularly at Lymington, in Hampshire.

The water at the Dog and Duck, in St. George's-fields, is a weak cathartic: it contains Epsom-salt and sea-salt, with one-twelfth of the residuum of insoluble matter.

The mineral water at Streatham contains Epsom-salt, sea-salt, and selenite: it is cathartic, and curdles with soap, and also with milk, when boiled with it.

The mineral water near Cobham contains iron, with a small quantity of sea-salt. A gallon yields but seven grains of residuum.

Jessop's-wells are also chalybeate, but not so strongly so as the water at Streatham: they contain a very large proportion of Epsom-salt, and a little sea-salt.

# CHAP. II.

## STATE OF PROPERTY.

### SECT. I.—ESTATES, AND THEIR MANAGEMENT.

THERE are no very large estates in Surrey: it is supposed, that the largest does not much exceed 10,000*l.* per annum; and there are but few which reach near to that annual rent. The yeomanry in Surrey are by no means so numerous as they are in the adjoining county of Kent; though in the western part of the county, round Guildford, and in some parts of the Weald, there are several gentlemen who farm their own estates, of from 200*l.* to 400*l.* per annum.

The causes which have broken down many of the large estates in Surrey, especially near the metropolis, are obvious: near all large commercial towns, and especially near a city of such magnitude and riches as London, there is always a great demand for landed property of small extent, immediately round the metropolis, for the purposes of building upon; and at a greater distance, for the retirement of such commercial men as have made their fortune. The more completely a large estate is broken down to meet the general demand, the higher will be the price which it will give. The demand for land near the metropolis is not, in general, for a large estate, to be considered as the family estate, or with a view to profit; but for ground sufficient for pleasure, to correspond with the size and appearance

Digitized by Google

pearance of the house, or at the most, sufficient to indulge the now fashionable taste for picturesque improvement, or for agriculture. Besides, the high price, which the great demand for land in a county situated as Surrey is, and moreover, recommended as it is by the healthiness of its climate, and the general beauty of its scenery, necessarily fixes on estates there, prevents property from accumulating to such an extent as it does in other counties, at a greater distance from the metropolis. These causes operate most powerfully in the northern parts of the county : as we approach its southern and western extremities, especially the former, where the appearance of the country, the healthiness of the climate, and the roads, are not nearly so favourable—the state of landed property is more similar to what it is in other counties.

The management of most of the estates in this county is in the hands of attorneys; that is, the drawing up of the leases, the insertion of the terms and covenants, and the superintendance of their execution during the currency of the lease, are committed to their care. This has been long the subject of much and general complaint—in some respects, justly; but certainly in other respects, without the least foundation.

As leases are a legal contract, that is, as the breach of any of the covenants they contain must be the object of a suit at law, it is certainly expedient, for the satisfaction of both parties concerned in the lease, and for the avoiding as much as possible of uncertainty and litigation, that the terms agreed upon by the landlord and the tenant should be expressed in that language, and given with all that precision and fullness, which only a person versant in the law knows how and when to employ. So far, it is proper to commit the landed property

Digitized by Google

property into the hands of attornies; but for the very same reason, their charge should cease here, and be confined to the single point, of giving legal precision to the conditions agreed upon by the landlord and tenant. It is as absurd to employ an attorney to frame the agricultural covenants of a lease, or to constitute him the sole judge of their observance or breach, as it would be to give into the hands of a farmer, the charge of putting the covenants into the technical language of the law.

In these observations, we have confined ourselves strictly and entirely to one part of the question: it will be time enough to consider who is the most proper person to insert the covenants or restrictions in a lease, after we shall have examined, under the head of Leases, whether it would not be highly for the advantage of the country and of agriculture, without being at all injurious to the interests of the landlord, if special rules or restrictions were banished, in a great measure, from leases. At present we shall just remark, that till the farmer becomes active, inquisitive, free from prejudice, and intelligent, not all the covenants that were ever devised, though the execution of them were guarded by the vigilance of the attorney and land-steward conjointly, will prevent him from injuring himself and his landlord, by his bad husbandry; that, when the farmer becomes intelligent and active, he will, for his own sake, take care of his landlord's interest, by far the greatest part of his lease; and that the first, and perhaps the principal step, towards forcing the farmer to become active and intelligent, is, to leave him to the exertions of his own mind.

### SECT. II.—TENURES.

The tenures in this county are principally freehold; there is not much copyhold. In the Weald of Surrey, Christ's-church Hospital possesses a considerable estate. There is also, in different parts of the county, a good deal of land held under church leases.

# CHAP. III.

## BUILDINGS.

### SECT. I.—HOUSES OF PROPRIETORS.

THERE are few counties which can vie with Surrey in the number and elegance of its gentlemen's seats. It possesses a great advantage over Middlesex and Essex, in lying to the south of London, and of course in being almost entirely, and at all seasons of the year, free from the haze and smoke of the metropolis, which, by the prevalence of the south-west winds, are driven from it: the pure and dry air of its chalk-hills, the beautiful variety of its surface, and the healthy and pleasant rides which its Downs present, all contribute to render it preferable, as a country residence, to the counties just mentioned.

In the more immediate neighbourhood of London, the principal houses chiefly belong to such as can hardly be styled landed proprietors, as the whole of their property seldom consists of more than a few acres of meadow and pasture ground, besides the gardens and pleasure-grounds attached to the house. But at a greater distance, there are many houses belonging to noblemen and gentlemen of landed estates in this county, as justly celebrated for the taste and elegance of the plan on which they are built, and for the beautiful and charming situation in which they stand, as any that are to be met with in the kingdom. Where there is such a great number, it would be almost impossible to give a complete list, and improper to name only a few.

It is of more importance, at least in an agricultural point of view, to remark, that several of the most considerable and respectable landed proprietors of this county, reside generally on their estates; and by keeping farms in their own hands, and by the zealous and judicious attention and skill they pay to the management of them, and the eagerness with which they introduce or patronize improvements, have tended much to advance the agriculture of Surrey. There may be, perhaps, methods less objectionable, and more certain of attaining success, whereby improvements in agriculture may be introduced, than the mere agricultural knowledge and zeal of the landed proprietors; but certainly, without this disposition, most other methods would be much weakened and checked in their operation.

## SECT. II.—FARM-HOUSES AND OFFICES.

It has been remarked, that the state of agriculture in any district may safely be inferred from the state of the farm-houses and offices. This rule, like many others, is laid down rather too broadly: there can be no doubt, that in every district in which the farmers have been, for a considerable length of time, intelligent, active, and successful, the farm houses and offices will assume the appearance and condition which alone would please and satisfy such farmers; but, at least with regard to the farm-houses, *they* may be indifferently planned and poorly built, even in a district

Digitized by Google

where agricultural improvements are rapidly advancing. His house is generally the last object to which a good farmer turns his attention, or on which he lays out his capital: his land and his farm-offices demand the first outlay of his attention, skill, and money.

However, the state of the farm-houses, though not an independent and certain proof, may justly be regarded as a strong collateral and presumptive evidence of the state of agriculture; and in this light, it may be regarded in Surrey. In passing into the Vale or Weald of Surrey, the eye is not more struck with the appearance of inferiority in the management of the lands, the badness of the crops, the uncouthness and want of intelligence among the farmers, and the general circumstances attending inadequate skill and capital—than it is with the ruinous and mean appearance of the farm-houses and offices. In the other parts of the county, the farm-houses are generally sufficiently large and convenient, in good repair, and kept neat and clean: their size, and the mode and materials of their construction, vary with their age. The oldest are built entirely of brick, and their covering is generally of large heavy slatestone; others are of brick-nogging, covered with tiles; and many are built of a framing of wood, lathed and plastered, or rough-cast.

The situation of the farm-house and offices is not often convenient and proper: this seems to arise, partly from want of attention and judgment when they were first built, and partly from the farms to which they belong having been enlarged, at different times, since the houses were erected.

Some of the barns in Surrey are built of clay walls; but in general, they are made of timber, placed on a foundation of brick or stone. They are very large and commo-

Digitized by Google

commodious; and were they always on or near the same spot, little or no objection could be made to them in any respect. Double floors in the barns are beginning to get into use.

The stables are large and roomy, but in one respect they are very objectionable: in most that I saw (and I was informed the case was general throughout the county), there was no proper division between the horses. The inconvenience and mischief attendant on this plan of construction, are obvious; while the additional expense necessary to alter it, is comparatively trifling. When horses stand in a stable all together, accidents are very liable to happen: an unruly or vicious horse may not only injure his neighbour, but the confusion will almost unavoidably spread over the whole stable; besides, where horses are fed without any division between them, it is impossible that each can get his due and proper proportion of food—a timid horse, or one that eats slowly, will always be wronged by his neighbour.

The cow-houses are well built and constructed, especially in the more immediate neighbourhood of London, and in those parts of the county where the rearing of calves is an object to the farmer. The cows are fastened up in the following manner:—two posts are placed upright in a horizontal cross-timber, above and below: one of these upright posts is made to slide in the upper horizontal timber. When it is intended to fasten the cow up, the loose post is pushed to a sufficient distance from the other to admit the cow's head; it is then put back into its place, and fastened with a wooden pin. The cow is thus made secure, without the danger that attends fastening her with a rope round the neck.

" On the hills of Surrey (as Mr. Marshall remarks), there

Digitized by Google

there is an ingenious method of laying plain tiles, so as to give vent to the steam of a brewhouse. Instead of placing them close, a space of two inches is left between every two tiles; thus making the covering sufficiently open to let out the steam, yet close enough (when the pitch is not too flat, nor the gauge too long) to shoot off rain-water.

" There too (he continues) I have seen a species of hip tiles, in an eligible form, namely, a triangle with the three corners cut off, and the lower end, or base, somewhat rounding. The length about a foot, and the width at the base the same. The whole is hollow as a ridge tile: the depth of the hollow at the base being three inches, with a nail hole near the upper point*."

There are very few farm-yards in this county, in which the general plan and construction presents any thing remarkable. A plan for a farm-house and offices, suitable to a farmer, where convenience and economy are more studied than smartness and elegance of appearance, is still much wanted. The least exceptionable in their plan, are the buildings at Effingham-hall (after the construction of Lord Egremont's, at Petworth, in Sussex), those at Norbury farm, the seat of William Coles, Esq which in some points are excellent, and in some respects, the King's farmery at Mortlake; but we must repeat, that a plan for a *farmer* is still a desideratum.

Such farmers in Surrey as lie near the chalk, are very careful to bottom their farm-yards with it; a measure which cannot be too highly commended, and which indeed would pay well, even where the chalk is at a considerable distance.

---

* Marshall's Southern Counties, ii. p. 397.

Chalk is also used, especially on the hills, to line the drinking pools; great care is taken to render the bottoms of these water-tight, in the following manner: after a lining of chalk, half a foot thick, has been laid and rendered even and firm by being well beaten down, a mixture of pounded chalk and hot lime is spread over it, and this is repeated, till all the crevices or holes are filled up; thus, not only is the water prevented from oozing out, but the attacks of worms are prevented. Many of the drinking pools are fed artificially, by cuts made to a considerable distance, and kept open and clear with great regularity and care: in another respect, the attention of the Surrey hill farmers to their ponds is praiseworthy;—a small pond is dug out to receive the water immediately before it enters the principal pond; in this first pond the water is suffered to stand till it deposits all its dirt and mud; thus the difficulty and necessity of frequently clearing out the large and principal pond are avoided.

## SECT. III.—COTTAGES.

In some parts of the county, cottages go along with the farms: in this case, the situation of the farm servants is much benefited, as well as their attachment to the farm and their fidelity to their master much increased and secured. In other parts the farm-servants must take cottages where they can: in such cases, it is evident, that the bond of connexion between the farmer and his servants, upon which much of the comfort, and not a little of the success, of agricultural pursuits depends, must be loose and weak.

The cottages are in general sufficiently large and convenient for the people who occupy them: the rent of them runs from 2*l.* to 5*l.* per annum, varying either from their vicinity to London, or from their size. A small piece of ground, sufficient to grow a few potatoes, is generally attached to them. Their front is not unfrequently covered with a vine, which adds much to the picturesqueness of their appearance.

Upon the whole, the buildings of the farmers in Surrey (always excepting the Weald) may be considered as equal in point of goodness to those of most counties; and perhaps not less convenient than such as are to be found in those districts where agricultural improvement has not made greater progress.

# CHAP. IV.

## OCCUPATION.

### SECT. I.—SIZE OF FARMS.

IN some counties of England, the general size of the farms are large; in others, there are few to be met with but what are small; but in Surrey, such is the diversity in point of size, that it is impossible to give them any general character, or even to approach nearly to the real average. When to this circumstance is added, that the very expressions *great and small farms* convey very different meanings, in different parts of the kingdom, it will appear absolutely necessary to state the extremes, in point of size, in the different parts of Surrey, without attempting to give any general character.

The Weald of Surrey offers less variety in the size of its farms than any other part of the county; and the further we advance into the Weald, and recede from good roads and a dry soil, the smaller the farms in general become. There are scarcely any farms in this part of the county which reach 300 acres; most of them run from 100 to 150, and the smallest do not contain more than 40 or 50 acres. The size of the farms on the sandy loams is also small in general, running from 100 to 300 acres: a few falling below the first number, and perhaps a very few rising above 300 acres. In the western parts of the county, about Bagshot

shot and Cobham, there are scarcely any farms above 200 acres; and in general they run from 150 to 200 acres. On the borders of the Downs there are a few very large farms, *i. e.* farms from 600 to 1200 acres. Within seven or eight miles of London also, especially about Streatham and Norwood, there are some farms of from 500 to 700 acres and upwards. But the usual size, both in the Downs and within seven or eight miles of London, is from 250 to 300 acres. Nearer London, the ground is in the hands of market-gardeners and nurserymen, and of course is held in small quantities. The largest farm in the county is at Wanborough, between Guildford and Farnham: it contains 1600 acres, comprising a considerable quantity of chalky soil, on that part of the ridge, which from its appearance, is called "The Hog's Back." It is in the possession of Mr. Morris Birkbeck, whose activity and intelligence are fully equal to the proper management of this large concern.

From the preceding statement, it is obvious that the size of farms in Surrey varies extremely; and that it is impossible to ascertain exactly the average size, without much more trouble and time than the utility of the investigation would compensate for. Mr. Malcolm, who must have had opportunities as favourable as most people have enjoyed, for getting near the truth on this head, reckons that 170 acres will average the county. But although no general conclusion relative to the size of farms can be laid down with certainty, yet there are two circumstances, not unimportant, which may be stated as undoubted facts: in the first place, that the size of farms is more uniformly small and stationary in the Weald, than in any other district of the county;

and

and in the second place, that in every other part of Surrey, there appears to have been for some years past, and still to continue to be, a tendency to enlarge the size of farms. The circumstance of the principal buildings on many farms being very awkwardly and inconveniently situated for their present size, and the small barns that are scattered over every farm, comprehending more than 150 or 200 acres, sufficiently indicate, that many of the farms above that size were formerly parcelled out among several tenants. Besides these manifest proofs of an increase in the size of farms in this county, and the actual existence of a tendency to throw together such as are still below 200 acres, the general fact of the increase of capital among farmers, must operate on them in the same manner as it does on all other classes of men: it must lead them to extend their concerns, and will enable them to do so by giving them that decided superiority which a superior capital always possesses over an inferior one.

Much has been said and written on the subject of large farms: if the question be considered solely and exclusively with regard to the advantage of the community at large, there can be no doubt, that *it* must be benefited by every saving of labour; and the very fact, that one man manages, what before was under the superintendance of two or more farmers, proves that there is a saving of labour. The community reap advantage, if besides the saving of labour, there is at less expence of labour and money, more produce raised from the same ground: that this is the case generally, a comparison of small and large farms will sufficiently demonstrate; there are, no doubt, exceptions, but in most instances, large farms, that is, farms that run from 300 to 1000 acres, are much better cultivated than small farms, or farms that run from 50 to 200 acres.

But there is another point of view in which this subject ought to be considered: the small farmer, who is driven from his farm by its being engrossed by his richer neighbour, can never be at a loss how to employ his capital or his labour, and of course, the wealth of the community, or the quantity of articles which possess an exchangeable value, and are the objects of desire, will be increased; nor does it appear that *he* will have any reason to complain on the score of mere money, while he can still support or enrich himself equally well, though in a different line of life. But in every country, in all situations and circumstances, and in our own country, particularly in the situation in which it is now placed, it is of the highest importance to consider, whether a mere increase of wealth may not be purchased too dearly—whether it is prudent or wise to diminish the number of those whose souls are knit to their native land by stronger ties than are known to the mere manufacturer. To the patriot, it can be little satisfaction to see his country the richest in the world, if the measures and causes which make it rich, diminish in the most trifling degree its independence; either by raising any passion above the love of our country, or by diminishing the number of those who must be its most natural and powerful defenders. To the moralist it can afford little pleasure to be told, that by the saving of agricultural labour, the manufactures of his country will be extended or increased, if he perceive that by the change of employment the health and virtue of part of the community are sacrificed.

The objection to the consolidation of farms on these important grounds, would be greatly obviated, if the immense extent of uncultivated land in the kingdom were thrown open to receive the labour and capital of those who had been obliged to quit their former farms.

The enclosures into which farms in Surrey are divided are in general too small, and not well laid out. In the Weald, almost every enclosure is surrounded by a broad belt of coppice wood: in most of the other parts of the county the hedges are very crooked and irregular, filled with elm and other timber, sometimes covering nearly a tenth part of the whole area of the farm. The most open part of the county is near the Downs: here the few enclosures that have been made, are not only large, but unincumbered with much timber.

## SECT. II.—FARMERS.

THE character of the farmers, like the size of farms, is very various in Surrey: there are still to be found, especially in the Weald, and the more remote parts of the county, many of the old class of farmers; men who are shy and jealous in their communications; unwilling to adopt any new mode of husbandry; in short, with much of the ignorance and prejudice of former times, and with all its rigid and inflexible honesty—on whose bare word the utmost reliance may be placed, and who have so little of the *impartial* spirit of commerce, that they prefer selling their grain to an old customer at a lower price, to deserting him and accepting a higher offer from one with whom they have not been in the habit of dealing. The " round-frocked farmers" (for they pride themselves on frequenting the markets in the dress of their forefathers) are equal enemies to improvements in agriculture and relaxations in morals: they live in the world, little affected by the change of opinion and practice, and have no idea that any different education from what they themselves received, is necessary to enable their sons to conduct their farms or to sell their corn. "I learnt none of those things, and I have done well enough without them; then why should my son learn them?" is the only argument by which they reply to the alleged necessity of giving their sons a superior education.

In other parts of the county, less remote and distant from the metropolis, the farmers are more on a level with the age; they understand their own business, according to the new and more improved methods of conducting it, extremely well; but they are either unable or unwilling to communicate the knowledge they possess. To this general character there are, however, many exceptions: there are among the Surrey farmers, men who would lose nothing in point of liberal and useful knowledge, if they were placed by the side of the most intelligent agriculturists in the island. A knowledge of botany and natural history, sufficiently extensive and practical, to be of use to them in conducting their improvements upon some certain principles, is to be found among many of them. From the minds of these men, that suspicious jealousy with which farmers are too often justly charged, is entirely banished; and the knowledge they possess and are *willing to communicate*, the clearness of their minds, and the character of their studies, *enables them to communicate* in a pleasing and satisfactory manner.

The character of the farmer decides in a great degree the manner in which he conducts the work of his farm: those in the Weald, and upon the smaller farms in the more remote parts of the county, consider it absolutely necessary for the management of their farms, that they should work like their labourers; they have no idea of an active and comprehensive mind, which shall distribute the necessary labour of the farm, and ensure its due and regular performance without any personal participation. They attain their ends incompletely, after much toil and bustle, while many of the larger farmers, whose minds are disciplined so as to form a clear and simple rule of management, carry on all their various and complicated work, without appearing to take any part in it themselves.

When we approach within seven or eight miles of the metropolis, we find much of the land that is not occupied by the nurserymen and the farming-gardeners, in the hands of persons who have not been brought up to agricultural business: after having made some money in London, they take a farm, either for amusement, or from the idea (which was much more prevalent eight or ten years since than it is now), that the "farming business was a good business." In this new employment not very many of them succeed; they find the amusement they expected not unalloyed with care and anxiety; and the gains they anticipated, blasted by their own ignorance, or by the knavery of their servants. In Surrey, however, as well as in other counties bordering on large towns, there have not been wanting men uneducated in agriculture, who not only have succeeded well, but who have also benefited their farms and their new employment, by the spirit and freedom from prejudice, with which they have adopted agricultural improvements.

## SECT. III.—RENT.

If we except that part of Surrey which lies within the influence of the London markets, the rents of this county may be considered as low. The best lands, that is, the hazle loam, on a subsoil of chalk, and the rich sandy loams near Godalming, run from 25*s.* to 30*s.* per acre, where the leases have been granted within these last ten years. The clays of the Weald are in general very low rented; many farms there being lett for 10*s.* per acre, and few of them reaching 20*s.* The clay land in the other parts of the county is lett from 15*s.* to 20*s.* per acre. On the chalks, above the hazle loam, where the soil is thinner, the rents run from 16*s.* to 20*s.* per acre. When we come within seven or eight miles of London, the rent rises considerably, running from 40*s.* to 3*l.* Still nearer the metropolis, the ground that is possessed in small quantities by cow-keepers, nurserymen, &c. letts for 6*l.*, 8*l.*, and sometimes 10*l.* per acre.

Through the whole county, with the exception perhaps of the Weald, rents are looking upwards; farms which were lett on leases just expired, for 20*s.* per acre, are letting, or expected to be lett, for double, or more than double that rent. There can be little doubt, that much of the land in Surrey has not yet reached its value; at the same time, there are several circumstances which must always tend to keep down the rent of it below that rate at which a stranger to the county, from the mere consideration of its soil, and the advantages it possesses in being near the metropolis, would be induced to fix it. The expense of labouring a farm entirely under the plough, as most of the farms in Surrey

Digitized by Google

are, is very great, and continually increasing, and the exhausted state in which many of the farms are left, tends either directly to narrow the competition for them, or indirectly to the same effect, by inducing the landlord to lett them only from year to year, or, if during a lease, under highly restrictive covenants. From these causes, as well as from the aversion to tithes, grass land in Surrey, when it can be got in good condition, brings a higher proportioned rent than it does in most other counties. Grass land which does not enjoy any particular advantage from its situation or quality, will easily bring from *55s.* to *3l.* per acre.

### SECT. IV.—TITHE.

THE complaints of the farmers in this county, are as general as in the other parts of England, on the subject of tithes; not that there is more litigation or dispute between them and the tithe-holders than are to be found elsewhere. The objection to them is grounded on the rigid exaction in kind, or upon the instances that occur where they produce ill-will and expensive lawsuits.

It is the common opinion in Surrey, that a farm tithe-free, is better worth *20s.* per acre, than another farm, equally favoured in soil and situation, but which is tithed, is worth *13s.* This at first sight appears a disproportioned difference; but something more than the mere loss to the farmer, by his being obliged to pay tithe, must be taken into the account. He feels himself cramped in his exertions and improvements: it is indeed urged, that no man who is seriously bent upon the improvement of his land, will be deterred by the knowledge that he must pay part of the fruits of his expended capital, labour, and skill, to the tithe-holder. But those who contend thus, are not only opposed to fact, but seem ignorant of human nature. In every county, there are many farmers who declare, that they are unwilling to expend their capital upon improvements, solely because the tithe-holder, without contributing in the least to them, will share the advantages and profits resulting from them. Improvements, no doubt, go on, where tithes exist; but while human nature is what it is, there will always be more exertion, outlay of capital, and a brisker spirit of improvement, when all the benefit centres in the improver, than when he is obliged to share it with another. Improvements go on now, notwithstanding the existence of tithes; but it is as absurd to contend, that they would not become more general and more spirited if tithes were taken away, as it would be to contend, that a man would not exert himself more, and lay out his capital more freely, if he expected fifteen per cent. from his outlay and industry, than if he expected only ten per cent.

It is a very insufficient answer to contend, that the farmer who rents a farm that is tithed, is equally well off with him who rents a farm tithe-free, since, on account of the tithe, he has his farm so much the cheaper. The cases would be similar, provided the tithe were a fixed and regular sum; in this case, it would probably be a matter of indifference to the farmer, whether he paid 20*s*. per acre to the landlord, or 15*s*. to the landlord and 5*s*. to the tithe-holder. But where a part of the sum paid by the farmer is uncertain, and where, moreover, it increases with his labour, his skill, and the outlay of his capital, it is impossible to regard the farmer who holds a tithed farm as equally well off as the farmer who holds a farm tithe-free, unless the latter pays for his farm an additional sum, much more than the mere amount of the tithes of the former.

The tithes in Surrey in most cases are paid by a composition, which is seldom rated at its full value; six, seven, or eight shillings per acre for arable land, forming the usual composition. In some instances, however, particularly where from the application of the ground to the raising of more valuable crops than it formerly bore, such as hops, carrots, or garden-stuff for the London market, the value per acre was much increased, attempts have been made to draw the tithe in kind, which have generally produced much ill-will in the parish, and in some cases have induced the farmer to desist from his improvement, and to throw his ground again under its usual crops.

An incorrect opinion very generally prevails, that the clergy are the sole or the principal holders of the tithes; or at least, that all the instances of discouragement to agriculture, from the exaction of tithes in kind, &c. are to be found among the clergy. It is, however, but fair to remark, that in Surrey, as well as in many other parts of England, the most valuable tithes are in the hands of lay-men; and it will be found, that they are as strict as the clergy, in drawing the utmost from this kind of property.

Upon a subject which has been so very much canvassed, as a proper and adequate substitute for tithes, it is difficult to suggest any thing new: and when the subject is so deeply connected with the interests of different classes of the community, and so rooted in the present constitution of society, it is difficult to suggest any plan that will meet the views of the parties concerned,

cerned, and remove the evil, without injuring the interests of any of them. The great object of every plan for a commutation of tithes, should be to secure to the tithe-holders an annual sum, that should in all time forthcoming, bear the same proportion to the price of grain that it does at present: and while it preserved the tithe-holder from suffering by the depreciation of money, it should at the same time secure to the farmer, the entire and undisturbed enjoyment of the fruits of his improvement, during the currency of his lease. Perhaps the plan should go still further, to secure the interest of the tithe-holder: he ought not only to be guarded against suffering by the depreciation of money, but as the tithes, as they now exist, give him a right to a share in *the increased value of land absolutely considered*, the plan ought to preserve to him this right, if it could be done consistently with the good of the community.

The former part of the plan might perhaps be effected, by making the landlord pay to the tithe-holder, the price of a certain proportion of grain (to be fixed upon, according to the present value of tithes for arable and pasture land). This, no doubt, would in some degree affect the rental of the landlord; for though he would of course lett his land so much the higher, yet, as the money to be paid instead of tithes, would vary with the price of grain, and would rise the highest in dear seasons, it would be impossible for him exactly to fix such an additional rent, as would cover what he had to pay to the tithe-holder. An objection, connected with the preceding, also occurs to this plan, from its being calculated to give the tithe-holder more than his just share, in years when the crops were scanty, and the prices of grain very high. These no doubt

Digitized by Google

doubt are objections of some weight, but as it may be fairly admitted, that whenever tithes are commuted, the choice must be among plans, all of which are liable to some objections, perhaps the plan just noticed, will, in its leading principle, be found as little objectionable as any yet offered: at least, it does full justice to the interests of the tithe-holders, and frees the exertion, skill, and capital of the improver, completely from the restraints they are at present under. To the objection already hinted at, that this plan will make the landlord pay too much, and the tithe-holder get more than his due share, whenever the crops are scanty and the prices high, it may perhaps be a sufficient reply, that by the quantity of grain per acre being *fixed*, the price of which is to be paid in lieu of tithe; if the tithe-holder got more than he would at present get in scanty years, he would be at the same time debarred from having his proportion raised, by the increased produce of an improved soil, to which, at present, he is entitled*.

## SECT. V.—POOR-RATES.

The poor-rates in this county vary very much in different parts of it. From the "Abstract of the Returns made to the House of Commons, of the Expense of the Maintenance of the Poor in the year 1803," it appears that the average of the different hundreds was as follows :

---

* By the plan of paying the price of a certain quantity of grain per acre, in lieu of tithes, it is plain, that in an abundant season, the proprietor of the tithes would get less, and in a scanty season, he would get more, than he would by the present system; but as the price of grain rises much higher above the medium price, in a scanty crop, than it falls below it in an abundant crop, the proposed plan would, on the whole, raise the value of the property of the tithe-holder.

| | *Average rate per Pound.* | | |
|---|---|---|---|
| The hundred of Blackheath, .... | £.0 | 7 | 4½ |
| ———————— Brixton, ........... | 0 | 4 | 2 |
| ———————— Copthorne, ........ | 0 | 5 | 3¼ |
| ———————— Effingham, ........ | 0 | 6 | 8 |
| ———————— Elmbridge, ........ | 0 | 4 | 1½ |
| ———————— Farnham, .......... | 0 | 8 | 0¾ |
| ———————— Godalming, ...... | 0 | 9 | 11 |
| ———————— Godby, ........... | 0 | 3 | 9½ |
| ———————— Kingston, ......... | 0 | 3 | 6½ |
| ———————— Riegate, ........... | 0 | 5 | 7¼ |
| ———————— Tanridge, .......... | 0 | 5 | 2¼ |
| ———————— Wallington, .... | 0 | 5 | 8¼ |
| ———————— Woking, .......... | 0 | 5 | 11 |
| ———————— Wotton, ........... | 0 | 8 | 4 |
| Guildford town, ........................... | 0 | 7 | 1¼ |
| Southwark borough, ................... | 0 | 5 | 3½ |

The general average of the county in that year, was 5*s*. 8*d*. : the lowest rate was 8*d*. and the highest was 18*s*. in the pound.

In the general remarks at the end of the Abstract for Surrey, we are informed, that "The Clerk of the Peace states, that before the property-tax took place, the general professed proportion in most parts of this county was two-thirds, and as such it continues in the hundreds of Woking, Blackheath, Godalming, and the town of Guildford; but most other parts of this county, and particularly in the hundreds of Kingston, Elmbridge, Riegate, Tanridge, and Wallington, the parishes, since the passing of that act, have been assessed at the rack-rental. In eleven parishes, the rate in the pound is stated at the rack-rental: the average is 4s. 1¾d.

## SECT. VI.—LEASES.

Most farms in Surrey are lett on leases: the duration is generally for twenty-one years, though some are only for seven or fourteen years. A few farms are lett for three lives; the lease being renewable, generally on the payment of one year and a half's rent; sometimes two years' rents are paid, besides the usual fee to the steward of the manor. Church lands are commonly lett for twenty-one years, renewable every seven. There are, however, some extensive farms in this county, which are held without a lease, from year to year, entirely at the will of the landlord; and this custom is rather upon the increase in Surrey.

There are two principal reasons assigned for letting land without leases to tenants at will: in the first place, it is alleged, that the landlord, by letting his land for a term of fourteen or twenty-one years, or any longer period, actually receives almost every year during the currency of his lease, and certainly in the latter years of it, a less rent than he did at the commencement, from the depreciation in the value of money. In the second place, it is contended, that by letting his land from year to year, the landlord prevents it from being exhausted by the tenant.

To the first remark it may be replied, that the loss to the landlord by the depreciation of the value of money, will be in a great measure compensated by the higher rent he will get for his farm, if lett on lease, than if lett from year to year, and by the superior condition in which his land under the former system will be. Let us suppose two farms of equal soil, &c. to be lett, one during pleasure, the other for twenty-one years: there can be no doubt that the rent offered for the latter will much exceed that offered for the former, and of course, while the value of money is higher, the proprietor of the leasehold estate will get a greater sum than the proprietor of the other estate, lett to a tenant at will. But he will not only get a higher rent, he will also secure a more respectable and wealthy tenant for his farm; for it requires little penetration to perceive, that no farmer of large capital will enter on a farm where he sits at the pleasure of his landlord, and where of course his capital must be unemployed, or if employed, lying completely under the power of another. This leads us to the consideration of the second argument alleged in behalf of letting farms to tenants at will, viz. that thus they are less liable to be exhausted than if they were lett on a lease. Certainly, however, no man will take a farm from which he may be turned off after his first crop, for any other purpose but that of getting as much out of the land, with as little outlay as possible, during the year he possesses it; and the tenant who succeeds will follow the same plan, till in a few years the land will be completely exhausted. It may, perhaps, be difficult to preserve a farm which is lett on lease, from being scourged by the tenant towards the close of his lease; but certainly no method could be better devised for this very purpose, than the letting land only from year to year. It is by no means an extravagant supposition, that a farm constantly lett from year to year, where the tenant had no confidence that he would hold his farm for more than one year, would, at the expiration of twenty-one years, lett for less than it would have done at the beginning of that period on a lease of that duration*.

With respect to the objection of landlords to grant leases, from the depreciation of money, this might be in a great measure obviated, by fixing on a certain increase of the rent at the end of the first and second series of seven years (supposing the lease to be for twenty-one years). If the rate at which money depreciates could be accurately ascertained, this would be an unobjectionable mode: the tenant would have no reason to be dissatisfied with it, as though, at the end of the first and second series, he paid more *nominally* than he did during the first series of seven years, yet as he would during those periods be receiving proportionally more for his corn, &c. he would in fact, hold his farm, during the whole lease, at the same rent. After all, as this plan would be difficult of execution on solid and satisfactory data, the landlord should look to the superior state of fertility and cultivation in which his land when under lease, will be, to what it would be if lett to yearly tenants, as a sufficient recompense and motive for letting it uniformly on lease.

The duration of the lease must depend principally on the state of the land; where much is to be done, and of course a large capital to be laid out, the lease ought to be very long, in order both to allow the farmer to reap the reward of his labour and the just interest of his capital, and to keep the most important improvements under the same management, till they are brought to perfection. Where a farm requires to be completely drained, to have the enclosures arranged differently, and the ridges levelled and straightened, the farmer must not only go on slowly and regularly, but he must lie out of his capital for a considerable length of time, and expose himself to no little risk of absolute loss for some time immediately after his improvements.

---

* The proper statement of the case evidently is, to suppose the yearly tenant to act as if he believed that he would hold his farm no longer than one year: in this case, the farm would probably change its tenant, in the course of the twenty-one years, nearly as many times; for though the tenant who got it first might, if his landlord chose, keep possession for a few years, yet the subsequent tenants would hardly hold it for more than one year each.

There is one argument in favour of leases of considerable length, which may be drawn from the complaints so common in Surrey, as well as in other counties, of the mismanagement and wilful deterioration practised towards the end of a lease. We shall presently inquire, whether this evil might not be prevented in most cases: it is plain, however, that in a lease of twenty-one years, it can take place only once; whereas if the farm had been lett on three leases of seven years each, it would have been exposed to mismanagement thrice during the same period.

The practice of running out a farm at the close of a lease, the fear of mismanagement during the whole currency of it, and the strange opinion, very generally entertained, that farmers have profited so little by the improvements of the age, that they still must be kept in leading-strings, have introduced and continued the practice of inserting numerous positive and restrictive covenants into leases. In Surrey, they were beginning to wear out, but the unlucky circumstance of several farms having been left in a shameful state of dirt and exhaustion, and with their fences, &c. completely out of repair, has begun to make the landlords look for some efficient remedy. If the remedy looked only to the real evil, and to the period of the lease when the evil existed, no harm, but much good would be done; but to tie up the hands of a farmer during the whole currency of a twenty-one years lease, because for the two or three last years he may injure the landlord, is applying a remedy worse than the disease.

But it is argued, that unless positive rules are laid down for the cropping and management of the farm, during the whole lease, the farmer will mismanage his ground, and thus injure his landlord. At this rate, the tenant can be regarded merely as the bailiff or steward of the landlord, with this difference, that he is obliged to risk his capital in the plans of his landlord; and that these plans are not formed or changed according to existing circumstances, but determined beforehand and unchangeable. It requires little knowledge of agriculture to know, that no rules can be laid down for the management of any farm, even for one year, except such general ones as would not answer the wishes of the landlord; and to lay it down, that for a lease of seven, fourteen, or twenty-one years, a particular rotation of crops must be followed, is in fact defeating the object in view; since the farmer will either be ruined by observing it strictly and uniformly during his lease, or the covenants, though found in the lease, will never be enforced. There can be no doubt, therefore, that the covenants and restrictions should be as few and simple as possible, provided the interest of the landlord is secured; for if they are many and intricate, they must either cramp the exertions and check the improvements of the farmer, or they will be regarded

as

Digitized by Google

as a dead letter. But not only ought the covenants and restrictions to be few in number, but they should have reference to as short a period of the lease as is consistent with the interests of the landlord, for the reasons already assigned. And, indeed, if the landlord finds it so very difficult to keep the farmer to the terms of his lease for three or four years, how much more difficult must it be to watch him for fourteen or twenty-one years. But it is urged, that the farmer has more temptations to contravene his lease towards the end of it than during the first part of it. This is true, and it is an important observation, inasmuch as it points out a stronger and more watchful guard for the landlord's interests than any covenants. There can be no doubt that the interests of the tenant and the landlord perfectly coincide during part of the lease: nay, that the tenant has a much greater interest in the proper management of the land, during part of the lease at least, than the landlord has. The farmer has sunk his capital in his farm, and by no other means can he get it out with interest, than by careful and judicious management. If the ground come into the landlord's hands exhausted, it will for a few years be worth less than it formerly was, but it may be restored to its former value; whereas the mismanagement of the farmer destroys his capital altogether.

It then remains to be considered, till within what period of the termination of the lease, the interests of the farmer and the landlord are the same. It admits of little doubt, that it must be greatly against the interest of the tenant to mismanage or overcrop any land, from which he has still to take two or three crops. Let us suppose a field in good condition, which last year was in oats; a fair crop of wheat might probably

Digitized by Google

be got from it this year: and if this were the last year of the lease, it might be for the interest of the tenant to sow it with wheat: but there can be no doubt, that if he had to take other two or three crops from it, after the wheat, he would, taking all the crops together, lose much more than he would gain by taking wheat after oats. When, therefore, a tenant has an interest in the ground to the extent of two or three crops, he may be fairly left to that interest for his guidance, and for restraining him from injuring his landlord. As far, therefore, as regards cropping a farm, there appears no reason for covenants or restrictions till the three or four last years; during which they should be simple, but close, and a conformity to them strictly enforced. In Surrey, as well as in many other counties, the outgoing tenant is bound to leave a certain proportion in fallow, and sown down in grass, sometimes without payment from the incoming tenant; but more generally he is paid: the latter is certainly the best method, as it secures the work being well done.

Some leases restrain the tenant from selling his hay or straw: this in the neighbourhood of London is allowed, upon the condition expressed or implied, that as much manure shall be brought to the farm, as the hay and straw would have produced: but in other parts of Surrey, remote from the capital, the restriction is in force. The policy, or rather the necessity of this may, however, be doubted: and it is evident, if it were generally complied with, the quantity of hay and straw needed in the country by those who had no farms to supply them, could not be procured. During the greater part of the lease, the farmer's interest will lead him to lay sufficient manure on his lands, as certainly as it will prevent him from exhausting them by overcropping: and he will continue to supply his farm with manure, as long as he expects he will get the benefit of the manure: when he has only two or three crops to take, he will not, indeed, lay so much manure on, as when he had his whole rotation of four or six crops to look to: and at this period of his lease, it may be apprehended he will sell his straw and hay, without bringing back manure; but if he be allowed by his lease, to sell any manure he may have at the end of it to the incoming tenant, he will collect his usual quantity, from the certainty of making more by selling it to a person who must have it, than he could do by merely putting the money he got for his straw into his pocket*.

There is only one objection of any force to the plan of free leases: it may be urged, that they would do well enough, if farmers were generally well acquainted with the best mode of managing their land; but that in their present state, their ignorance must be guarded against. To this the answer is obvious: mere covenants will do little to remedy ignorance; instead of a general plan laid down in a lease, the landlord ought frequently every year to send his steward over each of his farms, and instruct the tenant what crops he ought to sow. As it is, surely a farmer ignorant of the best mode of cropping a farm, but constantly on the spot,

---

* With respect to the manure made on the farm during the greater part of the lease, the farmer for his own sake will not drive it off his farm, nor hoard it up: what he has collected at the end of his lease, he should be allowed to sell to the highest bidder: this is the least objectionable way: it will secure plenty of manure, and it is certainly much better for the incoming tenant to have plenty of manure, for the purchasing, than to get very little, very ill managed, for nothing, which would be the case, if the outgoing tenant expected nothing for it.

Digitized by Google

and well acquainted with the soil of his farm, is less likely to do harm to his landlord, than if he followed *invariably* the directions laid down for him in his lease, during the whole period of fourteen or twenty-one years. But the great objection to covenants is, that it tends to continue the ignorance of the farmer: it takes away from him all motives and objects of thought or improvement. Some evil would, no doubt, result from giving farmers, whose hands had long been tied up, their own way; they would go wrong, and do mischief for some time, but their eyes would soon open to a sense of their own interest. In short, the simple question is, whether it is better to fill a lease with covenants, which, if acted upon uniformly, and in all cases, must injure the farm, and *keep* the farmer ignorant, and if not acted upon, are of no use; or to lay the farmer under the necessity of trusting to himself alone for its management, and of gaining knowledge, even at the expense of some blunders and some loss?

It is confessedly a point of some difficulty, to keep a farmer who is so disposed, from injuring his farm, after his interest in it is nearly at an end. It is a good rule to offer the tenant a renewal of his lease at least three years before the old one expires: if he agrees to it, there is no danger of his overcropping or injuring his farm. If he do not, the landlord is put upon his guard: he knows certainly, that the tenant will quit at the end of the lease, and therefore should take proper means to see that his ground is not injured by improper management. With regard to the buildings, fences, &c. they should always be delivered to a tenant in a state declared by two judges, one appointed by him, and the other by the landlord, sufficient: and during the last year of the lease, they should again be surveyed, and if not in sufficient repair, the outgoing tenant should be obliged to pay, what, in the opinion of the judges, would make them so.

The repairs, during the currency of the lease, lie upon the landlord or tenant, in Surrey, according to the agreement. It is certainly preferable for both parties, that the repairs should be defrayed by the tenant: he will thus have an interest in taking care of the buildings, &c. In short, the lease should be drawn up so, that the landlord and tenant, *as such*, should have as little as possible to do with each other, till near its termination: the landlord should not interfere in the management of the farm, nor should the tenant depend upon the landlord for repairs. Thus the tenant would become more intelligent and respectable, and less dependent on his landlord; and the interests of agriculture, and consequently those of the landlord as well as the tenant, would be advanced.

The usual term of entry to the arable farms in Surrey, is at Michaelmas; the outgoing tenant keeping possession of the barns till the May following. Some inconvenience will arise, both to the incoming and outgoing tenant, whatever be the term of entry: perhaps, on the whole, the term of Michaelmas, for arable farms, is as little liable to objection as any other term.

## SECT. VII.—EXPENSE AND PROFIT.

THIS is difficult to get at, both because farmers, like other people, are not very willing to lay open their affairs; and because many of them, from not keeping their books in a very regular or minute manner, can only tell generally, the gross particulars of their expense and profit.

The first thing to be considered, is the expense of stocking a farm in Surrey; or, more properly speaking, the sum of money per acre, which a person ought to possess, before he enters upon his farm. He must have not only what will purchase the stock necessary for his farm, but he must have money enough to prevent his being obliged to sell any of his grain, &c. merely for the purpose of going on with his labour, or of paying his first year's rent. The following calculation takes in the expenses, or the principal expenses and outlays necessary in Surrey, about fourteen or fifteen miles from London, where the rent is paid at the quarter, when due, or a quarter after, on a farm of 100 acres.

*Expense of stocking a Farm of 100 Acres, and of managing it, and keeping the Family, and paying the Rent, for One Year.*

| | |
|---|---|
| Four horses, at 30*l.* each, ............ | £. 120 |
| Waggon, ............ | 50 |
| Three carts, ............ | 60 |
| Two ploughs, ............ | 7 |
| Harrows, &c. ............ | 10 |
| Harness, ............ | 20 |
| Seed, ............ | 75 |
| Keep of horses, ............ | 200 |
| Labour, ............ | 150 |
| Rent, at 30*s.* per acre, ............ | 150 |
| Tithe, at 6*s.* and other taxes, ............ | 75 |
| Keep of family, ............ | 150 |
| | £. 1077 |

As there are several other articles of outlay or expense, not noted; and as in some cases, several that are taken into the account, would run higher than they are here charged, we may conclude, that from 12*l.* to 15*l.* per acre, would be desirable, if not necessary, for a tenant entering on a farm in Surrey, even if he found it in good condition. To do justice to a farm in the Weald of Surrey, it is probable that 15*l.* per acre, would scarcely suffice: and it is not too much to maintain, that this part of Surrey will remain unprofitable to the landlord and tenant, till both the capital and the skill of the latter are much increased.

The expense and profit of a farm depend so much on local circumstances, so much on the nature of the soil, to which the rent seldom exactly corresponds, and above all, so much upon the activity, capital, and skill of the farmer, that it would be very unfair and unsafe to draw a general conclusion relative to the county, or even to any considerable extent of it, from the profits of any farm. The following calculations are founded rather upon the general expense and produce of the middle district of Surrey, upon the rich calcareous loams and the adjoining strong rich clays, than upon any individual instance: much must be added to the expense, and much taken from the profits, for which the comparative lowness of rent will not compensate, before these calculations can be applied to the Weald, or to most of the other districts in Surrey, except the fertile sands near Godalming; and perhaps something should be added to the profit side of the statement, which will more than make up for the additional labour and rent, before they will apply to some farms in the more immediate vicinity of London. In this calculation, as in the preceding one, the more prominent and regular articles are only noticed, either on the expense or profit side; and it is apprehended, if a balance were fairly struck of the articles omitted, the proportion of the expense and profit would scarcely be affected.

### *Expense per Acre, of a rich Clay Farm, under the Rotation of Tares, Wheat, Clover, Oats.*

*First and Second Years.*

| | | | |
|---|---|---|---|
| Six ploughings, harrowings, &c. | £.6 | 0 | 0 |
| Tare seed, two bushels, | 1 | 0 | 0 |
| Seed wheat, sowing, &c. | 1 | 2 | 0 |
| Reaping, | 0 | 14 | 0 |
| Getting in, | 0 | 4 | 0 |
| Thrashing four quarters, | 1 | 0 | 0 |
| Delivery, five miles, | 0 | 5 | 0 |
| Total expense of tares and wheat, | £.10 | 5 | 0 |

*Third Year, Clover.*

| | | | |
|---|---|---|---|
| Seed, and sowing, | £.0 | 14 | 0 |
| Mowing, two cuttings, | 0 | 7 | 0 |
| Making and getting in, | 1 | 5 | 0 |
| Cutting and binding for market, | 0 | 6 | 6 |
| Carriage, | 1 | 10 | 0 |
| Total expense of clover, | £.4 | 2 | 6 |

*Fourth Year, Oats.*

| | | | |
|---|---|---|---|
| One ploughing, harrowing, &c. | £.1 | 0 | 0 |
| Seed five bushels, sowing, | 1 | 0 | 0 |
| Mowing, | 0 | 3 | 6 |
| Getting in, | 0 | 8 | 0 |
| Thrashing six quarters, | 0 | 15 | 0 |
| Carriage, | 0 | 5 | 0 |
| Total expense of oats, | £.3 | 11 | 6 |

Rent,

| | | | |
|---|---|---|---|
| Rent, at 30*s*. per acre (tithe-free), for four years, | £.6 | 0 | 0 |
| Income tax, 1*s*. 6*d*. in the pound; poor-rates and church-rates 4*s*. 6*d*. | 1 | 16 | 0 |
| | 7 | 16 | 6 |
| Tares and wheat, | 10 | 5 | 0 |
| Clover, | 4 | 2 | 6 |
| Oats, | 3 | 11 | 6 |
| Total expense for four years, | £.25 | 15 | 6 |

### *PROFIT.*

| | | | |
|---|---|---|---|
| Tares, | £.1 | 0 | 0 |
| Wheat, four quarters per acre, at 16*s*. per load, | 12 | 16 | 0 |
| Clover, two loads and a half, two cuttings, at 5*l*. per load, | 12 | 10 | 0 |
| Oats six quarters, at 28*s*. | 8 | 8 | 0 |
| Total profit, | £.34 | 14 | 0 |
| Total expense, | 25 | 15 | 6 |
| Leaving a net profit of, | £.8 | 18 | 6 |

which being divided by four, gives rather more than 2*l*. 4*s*. per acre.

Digitized by Google

### *Calculation of the Expense and Profit per Acre on a Farm of rich Calcareous Loam, under the Rotation of Turnips, Barley, Clover, Wheat.*

#### *EXPENSE.*

*First Year, Turnips.*

| | £ | s. | d. |
|---|---|---|---|
| Five ploughings, harrowings, &c. | £.5 | 0 | 0 |
| Seed, sowing, | 0 | 2 | 6 |
| Two hoeings, | 0 | 12 | 0 |
| Total expense of the turnip crop, | £.5 | 14 | 6 |

*Second Year, Barley.*

| | £ | s. | d. |
|---|---|---|---|
| Two ploughings, | £ 2 | 0 | 0 |
| Seed, and sowing, | 1 | 1 | 0 |
| Mowing, | 0 | 4 | 6 |
| Getting in, | 0 | 10 | 0 |
| Thrashing 6 qrs. at 2*s*. 6*d*. | 0 | 15 | 0 |
| Carriage, | 0 | 6 | 0 |
| Total expense of barley, | £.4 | 16 | 6 |

*Third Year, Clover.*

| | £ | s. | d. |
|---|---|---|---|
| Seed, and sowing, | £.0 | 14 | 0 |
| Mowing, two cuttings, | 0 | 7 | 0 |
| Making, getting in, &c. | 1 | 5 | 0 |
| Cutting and binding, | 0 | 6 | 6 |
| Carriage, | 1 | 10 | 0 |
| Total expense of clover, | £.4 | 2 | 6 |

*Fourth Year, Wheat.*

| | | | |
|---|---|---|---|
| Ploughing, | £. 1 | 0 | 0 |
| Seed, &c. | 1 | 2 | 0 |
| Reaping, | 0 | 14 | 0 |
| Getting in, | 0 | 4 | 0 |
| Thrashing four quarters, | 1 | 0 | 0 |
| Delivery, | 0 | 5 | 0 |
| | £. 4 | 5 | 0 |
| Rent at 40*s*. tithe-free for four years, | £. 8 | 0 | 0 |
| Income tax, 1*s*. 6*d*. poor-rates and church-rates, 4*s*. 6*d*. in the pound, on 8*l*. | 2 | 8 | 0 |
| | £. 10 | 8 | 0 |
| Turnips, | 5 | 14 | 6 |
| Barley, | 4 | 16 | 6 |
| Clover, | 4 | 2 | 6 |
| Wheat, | 4 | 5 | 0 |
| | £. 29 | 6 | 6 |

*PROFIT.*

| | | | |
|---|---|---|---|
| 1st Year turnips, | £. 2 | 2 | 0 |
| 2d, Barley, 6 qrs. at 40*s*. per qr. | 12 | 0 | 0 |
| 3d, Clover, 2½ loads, the two cuttings at 5*l*. | 12 | 10 | 0 |
| 4th, Wheat, 4 qrs. at 16*l*. the load, | 12 | 16 | 0 |
| Total profit, | 39 | 8 | 0 |
| Total expense, | 29 | 6 | 6 |
| | £. 10 | 1 | 6 |

which being divided by four, gives rather more than 2*l*. 10*s*. net profit per acre.

This no doubt will appear a high profit per acre: and the produce stated both in this and the former calculation, will be deemed above the real average; but when it is considered that these calculations refer, the latter to a deep, rich, friable, hazle loam, on a calcareous subsoil, where good management is almost sure of producing large crops; and the former to a deep, rich clay, which, though more difficult to work, yet in such a climate as that of Surrey, is highly productive in most seasons; the produce stated, cannot justly be regarded as too large. The rent, indeed, for such soils is low, compared to what is frequently given for inferior soils, in a worse climate; but the fact is, that much ground in the part of Surrey referred to, is let at the rents stated in the calculations, though from every appearance, as the present leases fall in, the rents will be much increased.

In two respects the calcareous soil is hardly done justice to: the same expense of labour is set against it as against the clay soil, whereas it is worked at much less expense: and, in the second place, no portion is supposed to be under sainfoin, whereas one of the principal advantages the holder of a farm of calcareous soil possesses, arises from his being able to have part of it constantly under this valuable crop, which, for a trifling expense laid out the first year, will for eight or ten years produce on an average, at least one load and a half per acre, of a kind of hay, that always finds a ready sale in the London market, at a high price.

After all, we should constantly keep in mind, that no certainty can be attained on the head of expense and profit: whoever is acquainted with any particular county, and is in the habit of seeing much of the farmers,

Digitized by Google

farmers, can tell whether the farming business with them is profitable or not: no greater proof of the flourishing state of agriculture, and of the profits of the farmer, can exist, than the tendency in any district to enlarge the size of farms: this certainly proves an accumulation of capital among the farmers, but it will still remain a matter of enquiry, whether this accumulation arises from cheap farms, or good husbandry*.

---

* In cheap farms, the farmer *may* farm well: in dear farms, he *must* farm well: so that as far as regards the community, dear farms are an advantage: by dear farms is meant, farms let at such a rent, that the farmer will not be able to get the profit he ought, unless he possess and exert great skill and industry: we mean dear farms to those that are idle or ignorant, not dear to those who are good farmers.

Digitized by Google

# CHAP. V.

## IMPLEMENTMENTS.

### SECT. I.—PLOUGHS.

THERE is, perhaps, a greater variety of ploughs to be seen at work in the county of Surrey, than in any other county in England. In crossing the county in various directions, I observed twelve different kinds, and there are at least two or three more, besides those that are used only for particular purposes. The following is a tolerably correct list of the Surrey ploughs: 1. The common swing-plough. 2. A smaller swing-plough, with a patent cast-iron mould-board. 3. The Suffolk plough. 4. The Kentish turnwrest-plough. 5. A turnwrest-plough without wheels, either a foot or swing-plough. 6. The snap-plough. 7. The common one-wheel plough. 8. A variety of the one-wheeled plough, called a gig-plough. 9. The tack-plough. 10. The Norfolk. 11. The Staffordshire double-furrow plough. 12. Small Scotch swing-plough. 13. The double turnwrest-plough. A few observations on some of these ploughs, with a notice of the particular districts or soils, on which they are used, may be given.

1. The common *swing-plough* is used in the neighbourhood of London, in most parts of the Weald, and generally on the northern clays. It is drawn by three, four, five, or even six horses, according to the nature of the soil, the depth of the furrow, and the state in

which the ground is: four or five horses are generally used when the ground is first broken up, even though the soil is not very strong: after it is well pulverized, three or four are employed. I saw, however, between Bagshot and Chobham, five strong horses in a swing-plough, give a light furrow to a sandy loam, on which the manure was spread for wheat. On the "maam" land, or "black land," five or six horses are commonly put into this plough: and I was told, sometimes seven or eight.

The beam of this plough varies in length from seven to eight feet; and is thick in proportion: the mould-board is generally flat: in this case, a convex piece of plate iron is nailed on to the lowest part of the broad end of it, whenever it is necessary to throw the furrow-slice more completely over: it is sometimes made entirely of wood; sometimes the lower part of it is plated with iron. From the great weight of this instrument, and its very bad mechanical construction, there can be very little doubt, that the power required to draw it is nearly double what a lighter and better constructed plough would require. It ought also to be considered, that a plough not made on true mechanical principles, not only requires more power, but does its work much worse than a less imperfect implement.

2. The shorter and lighter *swing-plough*, with a cast-iron mould-board, is very generally used about Guildford, Ripley, Cobham, &c. on light soils, after they have been broken up with a heavier plough: they are wrought with two horses yoked a-breast, and seem to do their work well, and with ease to the horses. The curve of the mould-board might perhaps be improved; as it is at present constructed, it does not throw the furrow-slice completely over in that direction and po-

sition in which it ought to fall: it has been ascertained, that by laying the slice over at an angle of 45 degrees to the horizon, the greatest surface of land is exposed to the atmosphere, a good seam is made for the seed, and the harrows take an equal and firm hold of the soil. This plough seldom gives the furrow-slice this inclination: this may arise, however, as well from the proportion between the depth and breadth of the furrow-slice, as from the construction of the plough.

3. The *Suffolk plough* is used by Mr. Woodroffe, near Godstone, by Mr. Mortlake, near Merton, occasionally by Mr. Pennington, of Lee Place, and in the neighbourhood of London for earthing up potatoes and cabbages. The possibility of working strong clay well with a light plough and two horses, is thoroughly exemplified in Mr. Mortlake's farm near Merton: his light short Suffolk ploughs, with one handle, form a striking contrast to the heavy, long, and awkward swing ploughs generally used there.

4. The *Kentish turnwrest-plough* is very generally used on the strong lands that lie on the chalk, especially on the south side of the chalk-hills, where the surface is very steep, and the ground stiff and full of flints. As it is commonly made, it is extremely heavy, powerful, and strong: it will overcome any resistance without being broken; but its strength and weight, rather than its construction, enables it to perform the work it does. It has the fault common to all large and heavy ploughs, it requires the additional power of one or two horses to force it through the ground, beyond what would be necessary if it were constructed more agreeably to mechanical principles; if it were thus constructed, as much power might be commanded at much less expense of strength and labour. Its pecu-

liar use seems to be in breaking up new land when it is full of stones and the roots of furze, &c.; if it were confined to this business, it might, with six horses in it, prove of great advantage*: as it is used, with four horses to plough the chalky soils, even where they are strong, flinty, or steep, there seems a great waste of labour.

It has sometimes been held out, as a peculiar advantage of this plough, that it lays the ground flat without any interfurrows; but it may possibly be questioned, whether this is not a serious evil on the soils where it is usually employed; as they are strong, and, at least on their surface, retentive of water, it would appear advisable to have water-furrows. Mr. Marshall has suggested, that the extreme hardness of these soils would be much diminished (and consequently the necessity for employing the turnwrest-plough), if water-furrows were drawn in them after they had been ploughed flat and laid all one way by these ploughs. They are no doubt useful in ploughing the sides of steep hills; but a lighter plough on a similar principle, viz. of the *turnwrest*, would probably answer this purpose equally well.

---

* The following are the dimensions of a very strong turnwrest plough used for this purpose by Mr. Malcolm.

"The length of the beam is nine feet six inches, which is made of oak, five inches and a quarter thick, and four and a half broad. The foot is five and a quarter by three and a half, and three feet three inches long. The handles are placed above this, and secured to the end of the beam by tenons, and mortised below to the chop. At two feet six inches from the foot is a piece of ash or oak six or seven inches wide, and one and a half thick, which passes through the beam, and is secured into the chops in a transverse direction, which places the share from 20 to 22 inches from the beam. The share is always made with wrought iron, and in general weighs, according to the strength of the soil, from 28 to 34 pounds. The chop to which the share is fixed is about five feet long, five inches deep, and four inches wide. The point of the beam rests on an upright carriage, with two wooden wheels, from three feet to three feet six inches diameter, with wooden axletrees, above which is the frame, or, as it is sometimes called, the gallows, which has a sliding bolster fastened up by iron pins let into certain holes, to increase or decrease the height of the beam, and thereby to let the plough higher or lower into the ground."—*Malcolm's Agriculture of Surrey*, vol. i. p. 193.

5. The *turnwrest-ploughs*, without wheels, are principally confined to the south-east part of the county: the wetness of the soil in this part of Surrey obliges such as approve of the turnwrest-plough, to have it constructed without wheels, and to yoke their horses in it at length. I saw one at work, which was used as a common plough to *ridge* up the land; it was drawn by four oxen yoked double, and seemed to perform its work very well: the ground it was ploughing was strong and wet. As the nature of the soil and subsoil where these ploughs are used is not very stubborn, they are not so strong and heavy as the wheel turnwrest-ploughs.

6. The *snap-plough* is a good deal used in that part of Surrey which lies near East Grinstead: its construction is very similar in principle (but much stronger) to that of the double mould-board plough, which formerly used to be much employed in Scotland to earth up turnips, beans, and potatoes. The mould-boards are made to shift, so that it differs from the turnwrest merely in having a mould-board instead of a wrest: it is without foot or wheels.

7. The common *one-wheel plough*, or the variety of it, which will be noticed immediately, is used more generally in Surrey than any other kind, except the swing-plough. All the sandy loams about Godalming, Chobham, Ockham, Cobham, &c. are broken up with

this plough; and it is commonly used for every ploughing on the hazle loams, that lie along the northern edge of the chalk-hills. The strong loams are also ploughed with it, unless they are wet.

The beam of this plough is considerably shorter than that of the swing-plough. The part nearest the handles is about four inches broad and five inches thick; at the further end it is little more than three inches thick and about one in breadth: about half way along the beam, but rather nearer the thick end of it, two arms made of ash, four feet long and two inches and a half broad, are bolted one on each side the beam: these go in a sloping direction, and clasp the extremities of the axle-tree of the wheel. The wheel is about eighteen inches in diameter, and is set higher or lower as is found convenient, by means of a slider about three inches broad, which passes through the beam, and is fixed below to the land-side sloping arm.

8. The other *one-wheel plough* differs from that just described, merely in being without the sloping arms: the wheel is fixed to the slider, and the depth both in it and the other plough is regulated by holes made in it. This is called a gig-plough, and seems to be used indiscriminately with the one-wheeled plough.

9. The *tack-plough* is used principally in Epsom common-fields and the neighbourhood: it differs from the two former in no other important respect but in having two wheels instead of one.

10. I observed the *Norfolk plough* no where but at Oatlands. Mr. Kendall, the Duke of York's steward, complained, that the sharp narrow shares of the common ploughs of Surrey were constantly wearing, and that the daily expense for sharpening them was very great. The Norfolk-plough seems well calculated for

most of the soil of Oatlands; but certainly neither the Norfolk-plough, nor the experience of the Norfolk farmers, were at all fitted for the stiff and wet lands in the south-eastern part of the county, where Mr. Malcolm informs us both have been tried without success.

11. The *double-furrow plough* is in the hands of several farmers in different parts of the county; the reports I heard respecting it were various and rather contradictory. All agreed that it could not be used with advantage, except on ground tolerably level and free from stones; and that it does its work best when the soil has been previously well reduced by other ploughs: it may, therefore, be employed with advantage in giving the seed-furrow to barley land. Mr. Drewett, of Send, thinks it well calculated for breaking up one-year old lay for wheat. It is evident, that from its construction, it must take a faster hold of the ground than the swing-plough, and consequently will not be so easy thrown out.

On the other hand, the double-furrow plough is objected to as being very confined in its use; since it cannot be employed on land unless it has been previously broken up and reduced; nor on ground the surface of which is very uneven. It can be of little use where it is the custom to raise the crown of the ridge considerably above the furrow; since it cannot perform the operations either of *gathering or cleaving*. But, besides this objection, arising from its confined application, several farmers in Surrey, who have given it a fair trial, maintain that it does not do its work well, even where the soil and surface are favourable to its operations: it makes the furrow-slices *ride, i. e.* they are laid up by it too close and too narrow; or more properly speaking, in a field ploughed by the double plough,

Digitized by Google

plough, the two slices which it makes have more the appearance of one slice, with a very narrow seam between them, while every alternate slice, being made by a new furrow, is at a proper distance, and gives a sufficient seam.

12. *Small's Scotch swing-plough* is not used in any part of the county, except in the neighbourhood of Ewel, by Mr. Trotter, by Mr. W. Hall, and by one or two more. There seems a general prejudice against it among farmers, and most ploughmen, on account of its shortness and lightness.

13. The *double turnwrest-plough*. The plough to which Mr. Malcolm gives this name I have not seen. Mr. Malcolm gives a very minute and full description of the several parts of one that belonged to Mr. Smith, of Wilderwick, which he says performed its work admirably.—(*Malcolm's Agriculture of Surrey*, vol. i. p. 202.)

It is a very commonly received opinion, that every kind of soil requires a different kind of plough: this opinion is so firmly established, that if you recommend to the farmers of one district the use of a plough more simple and requiring less labour than their own, which has been used with success, for a length of time, in another part of the kingdom, the answer generally is, that every soil has its peculiar plough. It may be worth while to consider, how far this remark is just and true. Whatever, however, be its truth, there can be little doubt that a great variety of ploughs in the same kingdom, and especially within the same county, is an evil that ought to be removed, unless it can be proved that this variety is absolutely required. I should by no means wish to put a stop to trials and experiments with respect to ploughs, in order to determine

mine which were upon the best construction; where various ploughs are introduced merely to make a comparative trial, the object is undoubtedly good; and as this object will prevent their continuing to be used after the trial has been fairly made, no harm can result from any variety or change of ploughs introduced with this view. I object to a multitude of ploughs of different constructions being *established* in different parts of the island, and particularly in the same county, from the supposition that every soil or surface must have its peculiar plough.

I shall confine myself to a statement of the evil that results from a great variety of ploughs, within the narrow compass of a county. The first and most serious disadvantage is the bad work to which it must necessarily give rise: in Surrey, for example, where there are at least three kinds of ploughs, each of which requires a particular habit to hold well, viz. the swing, wheel, and turnwrest ploughs; and where the servants, particularly the unmarried ones, are very often changing masters, and removing from one part of the county to another, it must often happen, that the servant has to serve a new apprenticeship before he can hold his new plough well; and of course, that the master's ground will be ill-ploughed till that takes place. This aptitude to learn will not be increased, if the ploughman is obliged to manage a swing-plough instead of a wheel one: there can be little doubt, that the latter kind often produces indolent as well as bad workmen, and the good humour, and consequent docility of the servant, are not likely to be preserved long, where that indolence and unskilfulness must be both broken through.

In the next place, a disadvantage arises, resulting in an equal degree, indeed, from the variety of ploughs constructed on different principles, in use through the kingdom: an interchange of farmers, and consequently of the knowledge and skill of different counties, is in a great measure prevented by it. There are, no doubt, many other considerations which prevent men of capital and skill from taking farms in a distant part of the kingdom; but the knowledge that they will not have it in their power to get ploughmen to manage the ploughs they regard as the best, and the apprehension of not being able to retain their own county servants long, if they took them with them, certainly prevents many farmers from removing, where their skill and capital would be more advantageous both to themselves and to the public.

If, however, it can be shewn, that the variety of soils in the kingdom, or in any particular county, requires a variety of ploughs, in order to work them with the most effect and the least expense, these and other disadvantages must be put up with as unavoidable evils. This, I apprehend, is by no means the case; at least, to the extent generally contended for.

If we take into our consideration the different soils of this kingdom, both as they exist in themselves, and as they are operated upon by the different climates, we shall probably find, that as far as soil is concerned (omitting for the present the consideration of the different kinds of surface), only two different principles of construction are necessary for the ploughs that might be most advantageously used in Great Britain. The different degrees of tenacity in a soil, do not seem to require any variety in the construction of the plough; but merely greater strength in the materials, where the ground required a greater exertion in the horses to till it. A long continuance

Digitized by Google

tinuance of sultry weather reduces a tenacious soil to much the same state, with respect to ploughing, as a stony soil naturally is: and of course, the kind of plough fitted for a stony soil, will be found best calculated for a strong soil, when it is baked by the sun.

A strong soil, when in a moist state, cannot require a longer and heavier plough than a light dry soil: the only use of a greater length of mould-board, is to keep the plough better in the ground; this it effects by the greater weight of soil that lies on a long mould-board: but it is evident, that a smaller quantity of strong tenacious soil pressing on a short mould-board, will be equal in weight to a much greater quantity of light, pulverised soil, pressing on a long mould-board: while, therefore, strong land is not hardened very much by the dry weather, it would seem to require a shorter plough, than a soil of a less tenacious nature. This reasoning is confirmed by the fact, that the Rotheram plough and Small's Scotch plough (both of which are small ploughs), do their work extremely well on all the clays of the North of England (including Yorkshire) and Scotland. These clays (setting aside for the present the influence of climate upon them) are to the full as strong and tenacious as any to be found in the South of England.

Stony soils, or tenacious soils, when hardened by the sun, are very apt to throw the ploughs out: they therefore seem to require ploughs on a different construction from those best fitted for the other kinds of soil. A plough may be prevented from being thrown out, either by giving the point of the share a dip below the line of the furrow, or by a greater length of the mould-board, and a greater weight and length, correspondent to that, in the other parts of the plough. If the point of the share has a dip given it, the tendency of this dip to draw the plough too much down, must be counteracted: this is done by the wheel or wheels: these, however, are objectionable on many accounts: they increase the friction, and consequently the draught: they are apt to go wrong, and to be clogged and choaked with dirt. On these accounts, as well as on account of the effect of the dip itself, this mode of keeping the plough in the ground is objectionable: the line of draught of the horses, and the line in which all the different parts of the plough are *set*, ought if possible, always to coincide exactly; otherwise there are opposing forces, and the horses are working to a disadvantage, besides the increased friction and wear of the plough. It seems, therefore, advisable to give up this mode of keeping the plough in stony or hard ground, if any other method can be found out. The other method, that of increasing the length and weight of the plough, seems preferable: the draught will, no doubt, be thus increased; but probably not nearly so much, as when the line of operation in the ploughs and the line of draught in the horses are at variance: besides, in the former case, the increased draught can be calculated and adapted with greater exactness to the purpose of keeping the plough in the ground, while the increased strength can be exactly proportioned to the increased draught: in the latter case, the setting of the point of the share must be done in a great measure at random: that it is generally greater than is absolutely necessary to keep the plough in the ground, appears from the great pressure of the wheels on the surface: even if the dip could be given exactly, another difficulty remains, that of proportioning the strength or power exactly to the increased draught occasioned by the dip*.

It may however be questioned, whether a short plough, well made, and held by a skilful and attentive ploughman, is not fit to plough any soil, not stony to a very great degree, provided it is not rendered extremely hard by the influence of a very long dry summer. As on this supposition, we put climate out of the question, what is done on stony soils in the North of England, and in Scotland, may be regarded as a fair proof of what *might* be done in the South of England on similar soils. There the old Scotch, which is a long plough, is never used, unless the soil be stony to a very great degree: on all other stony soils, the common short plough is used: it no doubt requires to be made and set with greater skill, and to be held by a very attentive and experienced ploughman; and, perhaps after all, it seldom makes so good work on stony as on free soils: but, an inferior degree of accuracy and neatness in the work, is a less evil, than a greater

---

[*] Wheel ploughs are more objectionable when used on free and light soils, since then there can be no necessity for them, unless either the plough be ill made, or the ploughman be ill qualified for his work. In every thing that is wrong, it is always better to prevent than to remedy; especially if the application of the remedy is attended with bad effects in other respects, and if the knowledge that it can be applied encourages the evil. Both these bad consequences result from the use of wheels: the *bad setting* of the plough, or the unskilfulness of the ploughman, are no doubt, by means of them, prevented from burying the plough in the ground, but the remedy applied increases the draught and the friction, and consequently wears out the horses and plough sooner. Good mechanics and good ploughmen will never be numerous, where their ignorance or unskilfulness can so easily be remedied, as by the use of wheels to the plough.

draught occasioned either by wheels, or a longer, heavier plough: and it is an evil which will diminish as the skill of the mechanic and ploughman increase.

As all kinds of soil, therefore, are well ploughed (with a very few exceptions) by the short plough, well constructed and properly held, in the North of England*, it is fair to presume that all soils, in the South of England, might be wrought with the same plough, except only when they were hardened to a greater degree by the more intense and longer continued heat, than they are in the North.

If the preceding arguments are valid, and the examples cited in support of them are in point, it follows, that only one kind of plough is requisite, except on very stony land, or clay land, in a hot climate, which requires to be ploughed in the summer or autumn. On these a plough both longer and stronger would be necessary. The Kentish turnwrest-plough, as was before remarked, seems objectionable, because it makes its way through the ground, more by the force applied to it, than by the excellency of its construction; and is neither thrown out or broken, more by reason of the great weight and strength of its materials, than of the judgment and skill with which they are put together. A plough of the common kind, but of a greater length and strength, might probably be constructed, that would do the *hard* work of the turnwrest with less labour and in a more complete manner.

---

* The counties of Norfolk, Suffolk, and Essex, might have been quoted: but though they are more similar in point of heat, the two former contain no soil that can be properly called clay: and it was thought better to cite the North of England, and Scotland, a tract of country at least 300 miles in length; since it necessarily contained a greater variety of strong land than the single county of Essex. By the North of England, is always meant the country to the North of the city of York: by Scotland, is more particularly meant, all the south and south east counties, and the counties on the east coast, as far as Inverness.

It seems more difficult to suggest the principle, upon which a plough that would do its work well and easily on even or uneven ground, should be constructed. A wheel-plough would evidently be of advantage for down-hill work: but it is equally plain, that the wheel would be of no service when the plough was going up hill: perhaps, after all, even on hilly ground, except indeed it were very steep, a well constructed swing-plough, with steady horses and a good ploughman, would do its work better than any wheel-plough. Very steep land must be ploughed either with a plough with a shifting mould-board (which on many accounts is preferable to a turnwrest) or with a swing-plough, in a diagonal direction.

What has now been advanced, is not intended to settle the long agitated questions respecting the shape of the mould-board: this and many other points, it is plain, cannot be determined, till it is agreed in what position the furrow-slice should be thrown: all that is meant by the preceding remarks, is, that on almost every soil, and in almost every situation, only one *kind* of plough is necessary, that this is the swing-plough, of a short and light construction, in opposition to the different wheel-ploughs, or the old heavy swing-plough: if this position has been well supported, we shall have advanced one important step towards introducing ploughs, not varying very greatly, into the different parts of the kingdom. We may be just allowed to remark, that when the proper position of the furrow-slice is once settled, an acquaintance with the principles of mechanics will determine the form of the mould-board, much more easily, certainly, and speedily, than random experiments made with ploughs having mould-boards of all possible different forms.

If it has been satisfactorily shewn, that the short and light swing-plough might be used with advantage in almost every part of Surrey, there seems little or no room left for disputing about the number of horses that ought to be yoked in it: except when the greater heat of the climate renders the soil harder than it is in the North of England, two horses must be sufficient in Surrey as well as there: when it was necessary to plough the ground in a very hard state, three horses a-breast might be used, as is the case in Essex. It deserves consideration and experiment to determine, whether more is not, on the whole, lost than gained, when land is ploughed in such a state of hardness, as to require the force of more than three horses in a plough well constructed.

*Skim-ploughs.*—There are two kinds of this very useful implement in Surrey. In one, a small and light mould-board is fixed to the coulter, at such a height that it will pare off the surface to any depth that is required: the part thus pared off is of course laid into the bottom of the preceding furrow, and covered by the soil brought up by the proper mould-board. In the other kind, a very small plough is fixed below the beam, about half way between the sheath and the end of it: the effect is the same as in the skim-plough first described, but as it is less simple in its construction, it does not appear so useful.

*Trenching-ploughs.*—These are the same as those generally employed in other counties, and therefore do

not

Digitized by Google

not require any particular description. Mr. Drewitt prefers making use of two ploughs, when he means to trench his ground: the additional expense is not great, and the work, in his opinion, is much better performed.

*Draining-ploughs.*—The *mole-plough* is generally used for this purpose. Some farmers drain their grass land in the following manner: with a common plough they take a pretty deep and broad slice out: they then fix *the mole* on a Suffolk plough, and force it along the bottom of the furrow, after which the slice previously taken out, is laid back.

*Harrows.*—The common harrows are three feet wide in front, and four feet in the middle and back part. There are five bars lengthways and four across: the tines are twenty-four in number, and generally about eleven inches long. The harrows are frequently yoked in pairs, sometimes three or four are joined together by a chain and a bar: they are drawn in a diagonal direction. In seed-harrowing land, if it be wet, as many harrows are used as will cover the breadth of the ridge, fastened together by a pole of the same length: the horses walk in the furrows, and thus the land is harrowed without being poached. Drag-harrows are commonly six feet wide before, and about six feet and a half behind, with thirty tines, a foot long and very strong: a bar of iron is screwed on in a diagonal direction, in order to keep the whole tight and secure. Iron harrows are beginning to be used, and seem preferred to the drag-harrow, for every purpose to which it is generally applied: each iron harrow requires only one horse to draw it.

*Rollers.*—Most of the rollers used in Surrey are made of oak: they are of two kinds: the lighter is about six feet and a half long, and ten inches in diameter: it is either drawn by a pair of shafts, or simply by traces fixed to the axis: one horse only is yoked to it. The larger rollers are about two feet longer: the diameter varies from twenty-four to thirty inches. Two or three horses yoked to one or two pair of shafts, are employed in them. I saw very few iron rollers: in the Weald, spike rollers are not uncommon, to reduce their tough clay lands.

*Drills.*—These are met with in the western part of the county, about Ockham, Send, Esher, Chobham, Bagshot, Bramley, &c. and in some few parts of the south eastern division. They are commonly made to sow two drills at once, at nine inches distance: the seed drops from a hopper through a funnel into the drill, which is made by the share, which is placed immediately before the funnel: two horses are required to draw it.

*Horse-hoes.*—As the drilled crops in general are either hand-hoed, or not hoed at all, horse-hoes are not very common: most of them in use are made of a triangular form, some of them with hoes only: others with tines preceding and hoes following. At the distance used for drilling crops in Surrey, it is plain that no instrument drawn by a horse, can be employed with effect, or even with safety. Some attempts have been made to introduce horse-hoes that would hoe two drills at once, but these instruments, like the plough invented in the districts where they drill their turnips, for taking the earth from two rows at once, seems more ingenious than useful.

*Scufflers.*—There are several of these in the county, and from the great quantity of land they can go over *effectually* in a day, it is probable that their use will become still more general. Mr. Birkbeck, of Warnborough, is a great advocate for the use of them, and employs them very commonly on his barley land, instead of a ploughing and harrowing. In the hinder bar, which is seven feet and a half long, five tines, eighteen inches long, are placed: in the front bar, which is five feet nine inches, there are four tines of the same length as those in the hinder bar; about half way down the tines they are scooped out, and spread something like the feet of a duck, whence it is sometimes called the *duck-footed drag*, and sometimes, from the number of the tines, the *nine-share.* It has generally wheels, and sometimes handles: the latter seem of little use; the former, when they are fixed, as Mr. Birkbeck's are, in such a manner that, like the fore-wheels of a chaise, they can *turn short,* must be of great advantage in saving a long sweep at the ends of the field. Mr. Birkbeck puts six horses in his, and finds it can go over eight acres in a day.

*Thrashing-mills.*—There are not many of these in Surrey; for this many reasons are assigned; where they carry their wheat straw to the London market, they complain that it breaks it in such a manner that it would not sell. On many of the large farms, which have been made up from several small farms, the barns are so scattered, that a thrashing-machine, though otherwise desirable where so much corn is grown, would be of little advantage, as little or nothing would be saved by it. Besides these reasons, a prejudice has arisen among many farmers, from having seen or heard of thrashing-machines which, from being ill-constructed or ill-managed, did their work ill, and after having occasioned much trouble and expense, were at last obliged to be taken down as useless.

There are more thrashing-machines in the western part of the county, especially about Guildford and Godalming, than in the eastern part. Those that are properly made, and are worked by four horses, are calculated to thrash from twelve to sixteen quarters of wheat in a day of seven or eight hours. Some of them will thrash nearly twice as much oats or barley as wheat; others will not thrash more of the one than the other. It has often been objected to thrashing-machines, that they would not take the awns effectually off the barley; Mr. Birkbeck's, on the contrary, took them off so close to the grain, that, till he altered it, he found it difficult to sell his barley, from the very short and stubbed appearance it had. The beaters, or scutchers, on some of the cylinders strike upwards; this seems evidently a waste of power.

Some of Mr. Lester's patent corn-separators have been lately erected in Surrey. There can be little doubt that they are constructed on the most natural and best principle for separating the grain from the straw: this operation they perform by *friction*, not as the other machines do, by thrashing the corn out. In short, they employ the same method to get out the grain, as a person would naturally do, if he plucked a few ears of wheat, and wished to separate the grain from the straw.

One great advantage of this method, an advantage which recommends this machine more particularly to the notice of the farmers in the neighbourhood of London, who wish to send their wheat straw to market, is, that the straw is not the least bruised or broken by it. Besides, from the manner in which the common thrashing-machines are fed, the straw must come out in such a direction and so irregularly laid, that it requires a good deal of time and trouble to draw and *sort* it for bunching; whereas in Mr. Lester's machine, the corn is *fed* in sideways, so that the straw comes out in that direction which is best suited for bunching it.

Mr. Lester has within these few months greatly improved his corn-separator: the advantages of the improved one are,

1. It discharges the straw, clean and unbroken, parallel as it lay in the sheaf.

2. The *cavings* are completely separated from the chaff and corn.

3. The corn is freed from the chaff, and smutty wheat is cleaned.

4. The chaff and dust are discharged from a funnel without annoying the attendants.

5. The whole of the machinery is portable, and may easily be moved by the men who attend it.

With the power of four horses, and with three men or women and three boys, Mr. Lester warrants it to separate completely, from eight to twelve quarters of all kinds of corn in eight hours.

Mr. W. Hall, of Ewel, has tried for several years Mr. Lester's first machine, and found it to answer extremely well in every respect for wheat: barley and oats he never has occasion to thrash with it. He has lately got the improved machine, with which he is very well satisfied.

Mr. Lester's patent horse-power is a most useful invention: by means of a very simple contrivance, the machine may be stopped with ease at once, so that the accidents

dents that so often happen to horses in stopping a thrashing-machine are avoided. Such a man as Mr. Lester, who possesses uncommon zeal and ingenuity, cannot be too highly encouraged.

*Chaff-cutters.*—These are very general in every part of the county: some are worked by a horse, most of them, however, by the hand: some of them with one, others with two knives.

*Bruisers.*—These are not so much used as they ought to be, considering the great and evident benefit arising from breaking every kind of corn before it is given to horses.

*Waggons* are much more common in Surrey, among the farmers, than in Middlesex. They are generally twelve feet long, eighteen inches deep on a medium, three feet wide before, two feet two inches in the middle, and three feet six or eight inches in the hinder part: the fore-wheels are four feet two inches, and the hind-wheels five feet five inches in diameter. The carts used in Surrey near London are much the same as those employed in Middlesex, holding from 50 to 60 cubical feet, when they are not heaped; when heaped with dung, they carry about 70 or 80: they are generally drawn by three horses in summer and by four in winter. Smaller carts, drawn by two or three horses, are used at a greater distance from London: from four and a half to five feet and a half long in the body, from three to four feet broad behind, and from three feet four to three feet eight inches broad before: the depth behind varies from thirteen to fourteen inches; the

Digitized by Google

the wheels vary in breadth from nine to fourteen inches, the latter are used for grass land.

*One-horse Carts.*—Few if any of these are used in this county. While three, four, or five horses are yoked in a plough, it is not to be expected that single-horse carts will be generally introduced: the light swing-plough, with two horses yoked a-breast, and single-horse carts, will probably come into use together, or soon after one another. There are, however, some farmers, who, occasionally at least, employ the light swing-plough, with two horses yoked a-breast, and who yet object to the single-horse carts. The principle upon which both may be defended is, nevertheless, nearly the same: the slightest reflection on the most common principles of mechanics will shew us, that where horses are yoked at length they must draw to a great disadvantage; the line of draught varying in each according to its distance from the implement drawn. This variation will, no doubt, be greater in the plough than in the cart, because the former is much further below the power that draws it than the latter, and consequently the different lines of draught vary at a greater angle from each other, when three horses are yoked at length in a plough, than when they are yoked in the same manner in a cart. Besides this consideration, it is well known to be very difficult to get horses that are yoked at length, to pull with equal forco and at the same time; and even if they do, the horse in the shafts has a different kind of work to perform from those which are before him; of course, if they all walk the same pace, his labour is greater than that of the others. This is avoided when they are yoked a-breast in the plough; and probably the same mode of yoking would be best in the carts; as, however, it is not allowed by Act of Parliament, the introduction of single-horse carts in most situations would be advisable. It is often objected to them, that they require more men to the same number of horses; but this is not the true point of light in which we should view the question: do they require more men to do the same quantity of work? and even allowing they do, is not the greater expense for men more than counterbalanced by the greater quantity of work performed by the same number of horses? At some seasons, and for some of the operations of the farm, larger carts drawn by two horses might be necessary; but a greater number does not appear requisite for any purpose. In the Surrey carts drawn by three or four horses, there is seldom so much as a ton weight: in those districts where single-horse carts are employed, from 12 to 15 cwt. are usually put into each, even on roads much worse than most of those in Surrey. The carriers from Edinburgh to Glasgow put in each single-horse cart from 18 to 25 cwt.

*Winnowing-machines.*—Perhaps there is no implement which proves so clearly and strongly as winnowing-machines do, with what slowness and difficulty agricultural improvements travel. They appear to have been brought over from Holland, about a century ago, to Leith, by means of the famous Fletcher, of Salton: they probably came into general use in Scotland soon afterwards; and yet they are now scarcely known in any county to the south of Yorkshire. A few of them, upon a very good construction, are to be met with in Surrey; but the sail-fan is still used in nine cases out of ten. At the last Croydon fair, there was a winnowing-machine exposed for sale, and the notice which it attracted, together with the very circumstance of its being brought to a public fair, proved how great a rarity it was.

*Sowing-troughs.*—Every implement connected with seed-time is of consequence: any alteration that can be suggested, or any improvement that can be made in them, which will either render the sowing of grain more easy or more regular, is of material importance. In the north, they use a *sheet*, made up in a particular manner, and slung over the left shoulder, to sow the grain: in most parts of the South of England, they use a sowing-trough for the same purpose. That in Surrey is nowise peculiar; but it may be worth while to consider the respective advantages of the *sheet* and the *trough:* the former is evidently a less incumbrance to the sower; he can step with more ease and steadiness with it than if he had a wooden trough before him; on the other hand, if the trough is used, the man can set it down by the side of the sack, and fill it himself without the aid of another person; whereas when a sheet is used, the sower cannot fill it by himself, without the danger of spilling the corn: a woman is therefore generally employed to bring the seed from the sack to the sower; and whoever has witnessed her toil, when the ground is rough, crossing over the ridges, will feel a desire that her labour might be dispensed with: any implement that would unite the advantages of the *trough* and the *sheet*, would be a very desirable improvement.

*Machine for taking the Smut out of Wheat.*—The only machine for this purpose that I ever saw, or indeed heard of, was in the possession of Mr. W. Hall, of Ewel. As a miller in a very extensive line of practice, a great deal of wheat that was smutty necessarily came into his possession. This, of course, led him to think of some mode of separating the balls of smut from the sound grain; and he has completely effected his purpose by a very simple machine: this machine is in fact nearly the same as that used for *dressing flour:* it consists of a cylinder perforated with small holes: in the inside of it are a number of brushes, which are driven round with great rapidity. The wheat infected with smut is put into the cylinder, and the constant friction occasioned by the rapid motion of the brushes, effectually separates the smutty grain, which is driven out by the holes of the cylinder. Mr. Hall finds that it requires much more power to clean wheat by this machine than to dress flour. A machine on this construction might be a very useful appendage to every thrashing-machine, for the purpose of effectually cleaning all wheat intended for seed, or such wheat, meant for the market, as had a great proportion of smut in it.

# CHAP. VI.

## ENCLOSING.

THE situation and extent of the wastes, commons, and common-fields in Surrey, the nature of the soil of each, the loss and disgrace attending their present state, and the advantage that would result to the landed proprietors, the farmers, and the country at large, if they were brought into proper cultivation, will be fully considered when we come to the Chapter on Wastes. A few circumstances and facts which fall more properly under the present head, will alone be considered here.

If we consider, on the one hand, the vicinity of Surrey to the metropolis, and the consequent value of land, and facility of improving it and disposing of its produce, we shall be apt to be much surprised at the great proportion of wastes and commons; but on the other hand, the poor and sterile nature of a very considerable part of the wastes, at least, will serve to lessen our surprise.

Surrey, however, it must be confessed, appears, from the "General Report on Enclosures," lately published by the Board, to be behind most other counties, in the proportion which the land that has been enclosed and brought into cultivation, bears to the whole surface of the county. It appears, indeed, from this Report, that the first private Bill of Enclosure ever passed, was partly for the improvement of the old disparked grounds about Farnham, in the 8th year of Queen Anne.

In the list of acts for enclosures by counties, from the 1st of Queen Anne to 1797, Surrey presents but two acts relating to 437 acres, and one act with the number of acres not specified. During the first forty years of His present Majesty's reign, there have been five acts passed for Surrey, including between 5000 and 6000 acres.

The effects are very generally considered as beneficial in this county: with regard to produce, there is no doubt; and as an increase of produce, if regular and constant, must necessarily bring after it an increase of population, if not near the very spot, at least in the country at large, we should no more doubt the benefits of enclosing, as it respects population, when we know that the produce is thereby increased, than we should doubt if the effect followed the cause; even in cases where no direct and positive evidence can be adduced. Instances of temporary and individual distress among the poor may be the result, but they must give way wherever produce increases.

The expenses attending enclosures is one of the principal causes why they are not more general: of these expenses, the principal are those for fencing, and making roads: fences certainly in many instances are not absolutely necessary, or at least, the fields might be made of greater extent. The expense of roads is enormous and unavoidable. In making an enclosure at Cobham, of about 1500 acres, the total expense was 2700*l.*; out of which 1200*l.* went for roads. *In the* enclosure of the common fields near Ewel, the landlord allowed 8*s.* per rod for raising the quick-hedge to five years: the expense of bringing the commons there into a proa proper state for cultivating, by paring and burning, and three ploughings (including the charge for seed), was about 9*l*. per acre.

The common fields near Ewel have risen in rent nearly double: the commons, from being worth little or nothing, now lett from 25*s*. to 30*s*. per acre. The tithe in this county is generally commuted when an enclosure takes place: the tithe holder getting a fifth of the arable land and a ninth of the commons or pasture.

On the commons near Ewel, when taken in, wheat or turnips were generally sown the first crop; then pease or beans, which were followed by wheat, clover, and oats: the turnips and the white crops were good: the pease and beans were indifferent, and the clover was choaked, and nearly spoilt, by the natural grasses.

In forming the enclosures, it is the best and most approved practice to make a three foot ditch: the expense of which is 1*s*. 6*d*. per rod, if the ground is not stony. A double row of seedling quicks is then set. A great improvement on the common mode of setting them, has been adopted by Mr. William Hall, of Ewel: in many cases, the young quick suffers much from want of moisture: to prevent this, Mr. Hall sets the first row of quick *diagonally* on the first spit of earth, instead of horizontally; by this means the moisture easily gets to the roots. Perhaps, in order to prevent the failures arising from want of moisture, the practice of planting the quicks on a raised mound should be given up: this has been done with good effect in some parts of Lancashire, where a want of rain is not nearly so common or injurious as in Surrey. In some parts of the county, particularly about Send and Ripley, furze planted on a bank of sod, make a very common and good fence to the new enclosures. Building walls *en pisé* has been tried

Digitized by Google

tried at Oatlands: but whether it be owing to the badness of the materials, to their being improperly prepared, to some imperfection in the first construction, or to want of care of them after they were built, they certainly are now little better in appearance or real utility than the common mud walls in Scotland.

In the construction and mode of hanging the gates, there is nothing remarkable: in general they are strongly made, and seem sufficient for every purpose.

# CHAP. VII.

## ARABLE LAND.

IN the neighbourhood of large towns, little arable land, in general, is to be seen; and this is the case on the Middlesex side of London: but in Surrey, on the contrary, the proportion of arable land is very great, all over the county; and this proportion hardly seems to diminish as we approach the metropolis.

It is not very easy to ascertain the origin of thus keeping almost all the land under the plough: that it is still kept so, arises partly from habit, and partly from the opinion that the soil or the climate of Surrey is not calculated for grass. If we might be allowed to conjecture the original causes of the different application of the land, in two counties situated so much alike, as Surrey and Middlesex, with respect to market (which generally decides the application of land, even against soil and climate); the two following might be assigned as not improbable. In the first place, the great extent of downs in Surrey, would, at the first setting out of the land, appear to render unnecessary any great portion of pasture, except in situations and soils which naturally seemed to require such a mode of culture: but in Surrey, the surface, with the exception of the downs, is in general very flat; and we know that in former times, flat land was usually set apart for the plough. In the second place, the influence of London market on the productions of Surrey, would not begin to operate nearly so soon as it would do on the productions of Middlesex, from the greater vicinity, and the more easy communication of the latter county: of course Middlesex would get the start of Surrey in the supply of the London market, and before the latter could enter into competition, a total change in the system of agriculture would be necessary. This is at all times very difficult to bring about: and as the farmers, by the culture of sainfoin, could share the advantages of the London market without interfering with the products of Middlesex, or altering their own system, this of course would be adopted, and the plough permitted to occupy as much as before. As it is extremely difficult to account for the particular husbandry of any district, even when it has been introduced comparatively within a recent period, and does not present any singular appearance, this conjecture respecting a mode of husbandry confessedly old beyond the reach of tradition, must be received, as built on mere presumptive evidence.

## SECT. I.—TILLAGE.

SURREY may be considered as a county which in general is well tilled; that is, the several operations of ploughing, harrowing, rolling, &c. are performed with more care and skill than in many other counties in England. In the Weald, especially, the ploughing is done with great neatness and care.

But though the tillage of the ground in this county is in general substantially and well executed, the quantity of labour bestowed on the land is not so great as in many other counties, nor so great as some descriptions of soil in this county require. The appearance of the lighter loams, and the sandy soils, sufficiently proves that there is some deficiency or mismanagement in the labour bestowed upon them; in what particular point will be noticed hereafter. From the general character of being well tilled, must in some degree be excepted that part of the county which lies in the immediate neighbourhood of London: there, as in the neighbourhood of all great towns, too much dependence is placed on manure, too little on tillage. It is proper to add, that the approbation here expressed, is meant to be confined to the tillage itself; the plan or system of conducting it, is quite a distinct object, which will fall more properly to be considered under each separate head.

*Ploughing.*—The two great points in ploughing on which there prevails much difference of opinion, respect the depth of the furrow, and the angle which the furrow-slice ought to form with the horizon.

In every part of Surrey, I believe, except in the Weald, or on the thin chalk soils, deep ploughing is invariably practised, and indeed, looked upon as indispensably necessary for even a tolerable crop: by deep ploughing, I mean to the depth of six or eight inches: by shallow ploughing, such as is common in the Weald, to the depth of four or five inches.

The question respecting the proper depth of the furrow-slice, will probably never be positively determined; or, to speak more correctly, no conclusion at all general, or applicable even to any one particular soil, in most situations and climates, can reasonably be expected to be positively come at: and in agriculture, as well as in many other arts, a conclusion that is limited, by its dependence on a great variety of circumstances, is either in a great degree useless; or if these circumstances are not especially noted and attended to, it may prove highly injurious.

Digitized by Google

We may therefore be excused from entering on this question, and shall barely offer a few general and unconnected remarks. It is evident, that unless the benefit resulting from deep ploughing be undoubted and considerable, the farmer who practises it, is exposing himself to a certain increase of expense, for an uncertain or trifling advantage: as every farmer therefore may determine, whether under all circumstances, his land is much benefited by deep ploughing, though he might not be able to detail those circumstances so as to direct the practice of others, he ought, before he enters on or continues deep ploughing on a large scale, to ascertain positively by experiment, whether he is likely to profit by it. In defence of the practice of ploughing even light soils, with three or four horses, the Surrey farmers allege, that such a number is requisite to plough to the depth they do. Allowing this to be the case (which however on most of their soils, in most seasons, it is apprehended it is not) it certainly becomes a question of serious consideration, whether the greater depth of ploughing will improve the crops so much as to pay for one or two additional horses and a plough-boy.

In the next place, on soils lying upon a barren subsoil, such as are most of the lands in the Weald, it has been contended that deep ploughing is particularly necessary, in order to draw the water, by opening the soil lower, further from the roots of the plants, and to give the plants more room to seek their food in. It certainly is desirable, that a retentive subsoil should be removed considerably below the surface; and it is possible, that the plants may be benefited by increasing the extent of pasture for their roots: but it should also be recollected, that the first unavoidable consequence of bringing the cold, harsh, and unfertile subsoils of the Weald to the top, and mixing them with the old fertilized upper soil, would be, that for some, and probably, a number of years, the *whole soil* would be much injured. It can hardly be expected, therefore, that a tenant should introduce an *improvement* (allowing it to be so on the whole) for which he would certainly pay at the expense of his crops for many years, and which probably would wholly go to the benefit of his landlord or successor.

With respect to the angle at which the Surrey farmers prefer laying their furrow-slices, as their great object is to expose as much of the surface as possible to the sun and air, during the preparatory ploughings, and to get a good seam for their seed after their seed-furrow, they wish the slice to incline with a considerable angle to the horizon.

Perhaps nothing strikes a stranger more in Surrey, than the slow pace at which the ploughing is carried on; and which on examination appears to be more justly attributable to the size and fatness, and consequent sluggishness of the horses, than to the heaviness of the work. An acre a day is esteemed very good work: and much more commonly, not more than two-thirds or three-fourths of an acre is ploughed: it is, however, not unlikely that this slowness may in part be attributed to the number of hours, during which the ploughs are yoked, and to their not dividing the time. Eight hours in summer and seven in winter are the usual number: now, in the first place, this is at least one hour fewer than is customary in those counties where an acre, and an acre and a half, are ploughed in the day; and in the second place, more work may be done in the same number of hours, at two yokings, than at one. The Surrey farmers object to the plan of dividing the time, that much would be lost in going and returning where the field happened to be at a distance from the stable: this no doubt is an objection of some weight, where the farm is very large, or the farm offices not conveniently situated; but it may justly be questioned, whether the objections to one continued yoking, especially if that yoking includes the heat of the day, are not much greater than any advantage it possesses over the plan of two yokings. In summer, the men and horses will either be much exhausted by working from seven till three (the usual hours), or the men will be tempted to go at a very slow pace, or to rest often, in order to keep themselves and their horses in sufficient strength to get through the whole. It is also to be noticed, that even on the Surrey plan, some part of the eight hours is taken up, during the dinner of the ploughman, which he takes in the field. There can be little doubt, therefore, that the plan of yoking early in the morning, and of giving the men and horses respite and refreshment for three or four hours during the heat of the day, is preferable to the Surrey plan of one yoking.

The mode of yoking the horses in the plough, one before the other, is defended on the ground, that thus the land is much less poached, than if they drew abreast: this is no doubt true; but ought land ever to be ploughed, when it is so wet as to be poached by the horses? and if the land was properly laid up in round ridges, and the business of the farm properly arranged, would there ever be any necessity of ploughing it in that state? In those counties where the horses are yoked a-breast, it very seldom happens, that there is the least necessity for putting them at length, in order to keep the ground from being poached: and in all those counties there is soil as wet, and as liable to be injured by poaching, as any in Surrey, and in many of them, the climate is much more rainy. Even allowing that cases occurred when it might be advisable to yoke the horses at length, yet certainly the regular and common mode should be to yoke them a-breast, as the one by far the most proper, wherever it could possibly be adopted.

Perhaps the most common fault in the *operation* of ploughing, in this county, is that of giving the bottom of the furrow a slope towards the land side; this seems to arise from two causes: partly from the breadth of the furrow-slice being so much greater than that of the feather of the sock, by which means a part of it must be torn up by the force of the mould-board, and thus the bottom will be left uneven, and less deep where the sock did not cut it; and partly from the plough being *set with too much land*, to counteract which, it is necessary to press upon the left handle, and thus raise the feather of the sock above the level of the heel of the plough.

*Harrowing.*—The most common custom in Surrey is to yoke the harrows in pairs, with a man to every pair, and generally a boy behind to clear the harrows of the weeds, &c. and to lift them when they get entangled with each other: sometimes a boy drives the horses and a man walks behind. Three harrows in some cases are yoked together. The pace is uniformly very slow.

An obvious improvement would be, always to make one man drive three horses at the harrows, at a much quicker pace than is usual in Surrey; and by walking behind the harrows, with long reins, he might drive the horses and attend to the harrows at the same time.

The harrows are generally applied very judiciously, and consequently with good effect, except perhaps in the single instance of turning over the immense clods of the summer-fallow on the strong clays; here, no doubt, they are as useful as the plough would be, but that neither of them can be of much use on land in such a state, we shall endeavour to shew, when we come to treat of the mode of fallowing the northern clays.

In harrowing the clay lands after they have been sown with wheat, if they happen to be wet, a very simple and effectual mode of yoking is used, in order to prevent the poaching of the ridges by the horses walking on them. The harrows are fastened to a pole, the length of which is equal to the breadth of the ridge, by which means the horses can walk in the interfurrows, and draw the harrows as well as if they trod on the land. The sliding yoke is also used, which is thus described by Mr. Marshall.

" By means of a long yoke, oxen a-breast draw in the interfurrows; and to accommodate the yoke to the varying widths of the ridges, it is formed with two pieces of wood, connected by two large staples, moving in long *sliding mortises*, which pass along the middle of each piece. The crowns of the staples reaching the mortises, they are secured in such a manner as to give free play to the sliders, by means of keys or strong wooden pins: each slider, or distinct part of the yoke, having a draft iron a few inches from the inner bow-hole, with a chain or trace passing from that to the harrow, or pair of harrows, bending over the ridge of the narrow land, between the oxen."—*Marshall's Southern Counties*, vol. ii. p. 139.

It is considered by some farmers in Surrey, as of such

Digitized by Google

such great importance to be able to harrow their clay-lands (after the wheat is sown) with the horses in the interfurrows, that they contract the breadth of the ridges so as to answer that purpose; but it may justly be questioned, whether this is not purchasing an inferior advantage at the expense of a greater one, since, beside the objection that will be presently urged against narrow ridges, it is always hazardous to alter the ridges of clay soils.

*Ridges.*—The principle upon which the breadth of ridges is regulated in Surrey is, that their breadth should diminish in proportion to the wetness of the soil; never, however, making them narrower than six feet. The common breadth in the Weald, and on most of the northern clays, is nine or ten feet, and on the drier soils from twelve to twenty-four feet.

That wet land can be kept drier by being formed into ridges of six, eight, or ten feet, than if their breadth were fifteen or eighteen, is a very common opinion; but the reasons on which it is founded do not appear to me satisfactory; and the contrary, in fact, has been found to be the case in some districts. Before entering on the presumptive arguments on this point, it may be proper to premise, that if ground can be kept equally dry when laid in fifteen or eighteen feet ridges, as when laid in ridges of eight or ten feet, the former are preferable, as giving fewer interfurrows, where it is well known the grain neither grows so well, nor ripens so early as that on the ridges*. The objection to broad ridges on strong wet land, that the wheat on the crown is apt to be thrown out by the frost, may be obviated, either by *cleaving* the crown for one or two bouts before the gathering, or by sowing the wheat under furrow.

---

* The interfurrows in Surrey, on the clay soils, are uncommonly wide and deep; of course the proportion of land, where the grain grows not so well, and ripens not so early, is greater than when they are less so. To

Let us first consider *flat*, narrow ridges, which they commonly are made in Surrey, by the practice of constantly changing the crown and interfurrow alternately, even on wet land. It is plain, that if the crown of the ridge be not at all, or very little raised above the sides of it, the interfurrows will act merely as drains, that is, the greater part of the rain will be drawn off into them, by soaking through the ground to a depth nearly equal to the bottom of them. The ground, no doubt, will thus be made dry; but it will require a considerable time before all the water can drain off by this method; and the whole extent and depth of the *pasture* of the plants will necessarily be injured, by the water sinking through the upper soil, instead of running over an inclined surface. Whoever has examined a field laid up in narrow ridges, flat, or very little curved, will find that the ground continues a long time wet, and is soaked to a considerable depth; in other words, it is made very poachy, even when, from the appearance of its surface, it would be concluded that it is nearly dry and firm.

Nor is a narrow ridge rendered much drier, or much less liable to have water soaking through it, by the crown of the ridge being raised, unless indeed it be raised very high; and then the disadvantages in other

respects

---

To this it may be added, that it requires much more time to *take up* the interfurrows, than to plough an equal number of bouts on the ridge: of course, the more interfurrows there are in an acre, the longer time it will require to plough, besides the difficulty of turning the horses *short* at the end of narrow ridges.

Digitized by Google

respects counterbalance the good effects of raising the crown.

The very complaint, so general in Surrey, that even their deep and sound clays, to the north of the chalk-hills, are so soon rendered wet and poachy, and so very long in getting dry again, renders it extremely probable, either that their very deep ploughing, or their narrow ridges, are unfavourable to keeping the land dry: the former, by opening the soil to a considerable depth, will of course make it absorb more moisture; and the latter, by preventing the crowns from being raised sufficiently high, renders them unable to shoot off the rain that falls. This, at least, is certain, that in districts where the climate is much more wet than that of Surrey, soils equally strong and retentive are found by experience to be kept much drier when laid in fifteen or eighteen feet ridges, well rounded, than when laid in ridges of ten or twelve feet, with their crowns raised proportionally.

Such broad ridges raised in the middle, cannot indeed be ploughed by constantly splitting them; but this, though the best method on dry sound soils, ought never to be attempted on wet strong land, and when it is done, no *fast land* should be left, as is the case in Surrey, by the side of the interfurrows, but the whole ought to be ploughed *clean*. To the objection, that it would be impossible to cross-plough high ridges, the answer is obvious; let them be previously split down once or twice, which will lay them sufficiently flat for cross-ploughing, and at the same time preserve so much of the curved form as will enable the ploughman to gather up the ridges exactly as they were before.

At any rate, if ridges of nine or ten feet are kept on clay soils, they ought to be raised more than they commonly

are

Digitized by Google

are at present; and the inclination from the crown to the interfurrow should be preserved with more regularity and care than it is in many fields, especially in the more immediate neighbourhood of London: there, as has already been observed, the ploughing is not nearly so well executed as it is in most other parts of Surrey: it is no uncommon thing to see even the middle of the ridge lower than the sides, and of course the soil in that part poached or soured.

With regard to the form of the ridges, there is no appearance of the least deviation from a straight line, except in some of the common fields, and in some fields where the enclosures are crooked and irregular: where this is the case to an extreme degree, and the field is at the same time small, it is often thought advisable to retain or to resume the crooked ridges, following the bends of the hedges, as taking up less time to plough than would be required from the number of short ridges if they were drawn straight. Here the farmer has evidently only the choice of two evils: he must either draw his ridges so as to correspond with the bendings of his hedges, or he must submit to having a number of short ridges at every corner of the field, with a few straight ones in the middle; and it may, upon the whole, be best to follow the plan of some of the Surrey farmers in such cases, and to choose the crooked ridges as the least evil.

*Drilling.*—The drill husbandry can hardly be said to be extending itself, even in that part of Surrey where it has been practised for some years. It appears to have been introduced, or at least recommended, to the notice of the farmers on the sandy loams in the western division of the county, by the late Mr. Ducket, of Esher, who is well known to have been a strong advocate for drilling all sorts of grain, to have followed it extensively on his own farm, and to have invented many machines for drilling and hoeing the crops.

At present, the drill husbandry is almost entirely confined to the parishes of Bagshot, Chobham, Ockham, Cobham, Esher, Send, Ripley, Bramley, and the district immediately adjoining, and is seldom practised, except on light loams, or sandy soils. It does not appear to have established itself generally in any part of Surrey to the eastward of these parishes.

The crops most commonly drilled are wheat, barley, and pease: oats are sometimes drilled; beans, where they are not sown broad-cast, are put in by the hand. The distance at which most of these crops is drilled seldom exceeds nine or ten inches, so that the working the intervals with a horse-hoe is out of the question, and is indeed scarcely ever if at all attempted*.

Of white crops, wheat is most frequently drilled; and the reason assigned for preferring this mode of culture is, that in a drilled crop of wheat there are fewer broken down and inferior *heads*, than when the crop is sown broad-cast, and that the quality of the grain is better. I did not learn that drilling was preferred, as being, on the whole, a saving of expense, or as producing on an average of years superior crops to the broad-cast system.

By those of the Surrey farmers who live in the neighbourhood of the drill husbandry, but do not follow it,

---

* There may be some exceptions: Mr. Pennington, of Lee Place, in the south-eastern part of the county, for instance, generally uses the horse-hoe; but the common practice of the county, and not the practice of an individual farmer, is what I am most anxious to describe.

there

Digitized by Google

there are objections urged against its extension to *white corn*, which are of very great weight. The following are some of their chief objections.

*In the first place*, by the drill husbandry, the plants in the rows are much more crowded than they would have been, had the seed been sown broad-cast: this objection lies with great weight against drilling *white crops*, as their roots seek their *pasture* more by spreading than by penetrating to any great depth; of course, the less they are crowded, the better they will thrive.

*In the second place*, hand-hoeing is useless, if it be meant to clean the land from root-weeds, and to operate as a fallow: unnecessary, if it be meant merely to destroy seed-weeds, which might easily be kept down, in most years, by a crop covering the whole ground: and in every case, it must be prejudicial to the plants, by cutting or injuring their lateral and spreading roots. Where the drilled crops are not hoed at all, this mode of culture can have no other tendency but to fill the intervals with weeds, by leaving so much of the surface unoccupied.

*In the third place*, it is well known, that white crops, which are very thin on the ground, and afterwards *stool* or *tiller* very much, generally produce coarse grain; so that even allowing that the drilled crop should throw out shoots, so as to cover the intervals completely, it is most probable that the grain would be of an inferior quality.

*In the last place*, there is a manifest and very important difference between culmiferous and leguminous plants: the former bear their seed on the top of the stalk; the latter on lateral shoots from the stem: the former spread their roots; the latter push them downward: the former derive the greatest part of their nourishment during the time they are growing, and probably the whole while they are ripening, from the soil; the latter derive a considerable part of theirs from the moisture and the air, even while they are ripening. The reasons, therefore, which render the drilling of pulse advisable, do not apply, but rather seem adverse to the drilling of *white corn:* there is no necessity that it should be put in the ground with such interspaces, as to allow the air to get down to the bottom of the stalk of each plant; though allowing there were, we have already observed, that crowding the plants in drills, would be much more unfavourable to this purpose than the broad-cast system.

Some of the objections to the drill husbandry, when the distance is only nine or ten inches, appear to be removed, when the distance is increased so as to admit the horse-hoe: but, by this plan, one evil is certainly increased, while there is good reason to believe no real advantage is gained. If wheat, barley, or oats, be drilled at such a distance, that the horse-hoe can be used with advantage, and without injuring the plants, that is, at the distance of twenty inches or upwards, it will very seldom happen, that the corn will cover the ground, or produce a full crop: of course, the hoe will be necessary while it remains on the land, in order to keep the weeds down, and the crop itself will run great danger of being broken down by the wind. With regard to the supposed advantage from widening the intervals, that thus the root-weeds may be destroyed and a fallow rendered unnecessary, the futility of attempting to *make* foul land clean by horse-hoeing, will be considered at large under the article *fallowing.*

If therefore, the saving of seed is at least balanced by the expense of hoeing, or, where that is neglected, by the foulness of the land; and if the necessity for hoeing is in a great measure created by leaving so much of the ground unoccupied, there can be no good reason for drilling any crop, unless the *crop itself* be benefited by it; and it has already been observed, that white crops, bearing their seed on the top, do not require interspaces; and, shooting their roots near the surface, are liable to be broken down by the wind, or injured by the hoe. It ought also, always to be recollected, in discussing the merits of the drill husbandry, that if it gives some of the plants more room than they would have had in the broad-cast method, it crowds by far the greater number of them much more.

The propriety and advantage of drilling beans will easily be perceived from what has been said: the objection, that they as well as white corn are thus crowded, does not apply so far as regards their roots, which by being perpendicular and not lateral, do not interfere with each other; and, as far as regards the stalks, it is effectually obviated by the Surrey mode of planting them at such a distance in the rows, as to secure sufficient room and air for each stalk*.

It is much more difficult to determine on the propriety of drilling pease: on this point, the opinions of those farmers in Surrey, who are advocates for drilling beans, differ: this crop, as bearing its seed on lateral shoots to the bottom of the stalk, and moreover, as a creeping vegetable, appears to require as much room and air at least as the bean: of this, indeed, there can be no doubt; but it is urged, that by drilling pease, they in fact get air and room less equally than if they were sown broad-cast: and a fact that must have struck every person who has had a frequent opportunity of observing drilled pease, is adduced in support of this opinion. The tendrils of the pease in two distinct rows, are very apt to get entangled; and the first wind that rises, carries them over together, thus crowding one part of the ground, and leaving another part of it quite bare. So far, therefore, as regards the crop, there seems no reason to prefer the drill system; and with respect to the ground, it will probably be found, that it is left in better condition and more clean after a smothering crop of broad-cast pease, than after an expensive and careful hoeing of a drilled crop. As the propriety of drilling turnips, potatoes, sainfoin, &c. rests upon separate and specific grounds, it will be examined under each article: and the practice as well as the arguments of the Surrey farmers, with respect to one or both modes of cultivating these plants, will then be given.

---

* It is not easy to account for the practice in many counties where beans are drilled, of giving more seed to the acre that way, than if they were sown broad-cast.

*Hand-hoeing.*—There is no inattention or negligence on this point, where it is required and will pay for the expense, except in the instance of drilled crops; too many of which are to be seen untouched by the hoe, from the time they are put into the ground till the harvest. It is in general done in a very complete and workmanlike manner, so as not merely to benefit the crop that is growing, but the whole ground, and consequently the subsequent crops. The particular detail falls more properly under the head of each plant to which the hand-hoe is applied.

*Weeding.*—This operation is found to be indispensably necessary in the more immediate neighbourhood of London, where it is often practised both among the growing corn and among the clover. The crop near London, that seems to be most neglected in this respect, is the broad-cast beans: not only are the weeds suffered, in many instances, to choak the beans, but even to stand and shed their seeds after the crop has been harvested.

In other parts of the county, it is by some farmers carefully attended to, while there are too many, who render the labour of their more careful neighbours in a great degree useless, by the weeds which they suffer to stand and spread their seeds. I observed in several instances, that where a crop of turnips or rape had turned out ill, and afforded little prospect of recruiting, the field was neglected and the weeds suffered to rise and flourish: this is certainly wrong in two points of view; it impoverishes the soil, and destroys any little chance there may be of a crop on the ground. If it is thought proper to let a bad crop stand, every justice should be done to it by weeding: if it is thought not worth that expense, it had much better be ploughed down at once: or if it is not convenient to plough it down immediately, it ought, for the sake of the ground, to be kept clean while it is suffered to grow.

*Striking Furrows.*—As soon as the seed is harrowed in, the Surrey farmer is very careful to draw his inter-furrows with a strike-furrow plough: this in general is executed in a very sufficient manner. Water-furrows are also drawn by the plough, and cleaned out to the requisite depth, by the spade. But although these operations are seldom or never put off long after the seed is sown, yet they are too much neglected during the progress of the summer-fallow; especially while the land is lying cross ploughed. The certainty and dryness of the climate of Surrey, may perhaps fully justify this security: but no means should be omitted, which will prevent such a tract of country as the Weald—where the ground from its nature is easily made completely wet, and from its flatness and want of ventilation, when wet, becomes dry again only by the long continuance of windy or hot weather—from being injured by surface water. It ought to lie as short a time as possible cross ploughed; and during the whole time it is in that state, the interfurrows and water-furrows should be as completely and carefully cleaned out after each harrowing, as they are, or ought to be, after the seed is sown.

Some of the more judicious and careful of the Surrey farmers, draw a water-furrow in an oblique angle to the direction of the ridges where their length is very great, in order to prevent that accumulation of water, which would otherwise take place in the interfurrows: this mode seems advisable also, and is indeed practised, where the surface of the field has a considerable inclination, as in this case, the rapidity of the stream in the interfurrow, would be as injurious in carrying down the soil, as the great accumulation of water would be in the case of very long ridges.

## SECT. II.—FALLOWING.

As the question respecting the advantage or the necessity of a bare summer-fallow, is not only of the highest importance, but also appears to have been obscured and left undetermined, principally from the neglect of a regular and precise statement of the arguments and facts adduced by the two contending parties, a few general observations may be allowed on the subject.

The most intelligent farmers of the North of England and of Scotland, in general contend, that on strong and wet clays, summer-fallow is absolutely necessary. It has been supposed and asserted, that they mean to contend, that a bare summer-fallow is as indispensably necessary every fourth or sixth year (or at any given regular period), as the operations of ploughing and harrowing are: here, at the very outset, their meaning is misunderstood. In order, however, to explain it fully and accurately, it is necessary to consider what object or objects they propose to themselves by the regular introduction of a bare fallow. Few, if any of them (we believe), will now rest their cause on any supposed renewal or increase of fertility, which the soil may receive from being exposed, without a crop, to the influence of the atmosphere, or from being repeatedly ploughed and harrowed: their object is effectually to clean their land when it becomes foul, and as they find from experience, that with the best rotation, and the utmost care and vigilance, their wet, strong clay lands, become foul at the end of four, or six, or eight years, they consider the regular or at least the common introduction of summer-fallow, once during any of the above-mentioned periods, as useful and necessary. They do not fallow at the expiration of four, or six, or eight years, merely because four, or six, or eight years have elapsed since the last fallow, but because they then find their lands foul, and therefore consider the introduction of a summer-fallow necessary.

But, say the farmers of the South of England, we can crop our lands be they ever so strong and wet, as long as we choose, without bringing in a bare summer-fallow: and as our clays are to the full as strong and wet as any that are to be found in Scotland, summer-fallow might there be dispensed with as well as in the South of England; and to continue it, is a great proof of the prejudice and stubbornness of the Scotch farmer.

To this it may be replied:

1. That many farmers in Scotland have endeavoured to do without summer-fallow, but have constantly been obliged to have recourse to it again, whenever they wished to make their land clean. The regular use of summer-fallow therefore cannot be considered as the effect of prejudice or stubbornness; nor, until the fallowists can be taught how to keep wet clays clean, and at the same time under crop every year, is it to be expected, that they will give up their system. It may be objected, that if proper attention and labour were bestowed on their clay lands, they never would become foul; or that if they did chance to become foul, the introduction of drill and green crops, properly managed, would make them clean again. Here then the question is at issue on two points: can wet, strong clay lands be *kept* constantly clean? or, if they chance to become foul, can they be *made* clean again without the introduction of summer-fallow?

As it is absolutely impossible, even by repeated summer-fallows for several years successively, to destroy all root-weeds, it is absurd to expect that drilling, or in other words, *fallowing incompletely only part of the land*, though it is performed every year, will entirely free the ground from root-weeds: besides, when the crop fails, or when the season proves wet and cold, the root-weeds will increase and spread, in spite of all the horse and hand-hoeing, that in such seasons* can be used. But if the land cannot be *kept* clean by drill crops regularly and carefully hoed, it cannot surely be expected that it can be *made* clean, after it has become foul.

But the question may be easily decided, by a brief statement of the means by which the anti-fallowists *keep* their land clean, or perhaps, more properly speaking, *make* it so, without the assistance of a summer-fallow. Is not their land, in fact, frequently fallowed, that is, is it not repeatedly ploughed, harrowed, and rolled, and the root-weeds gathered off between almost every crop? If they can show land completely clean, after having borne a constant succession of crops for a number of years, without any other mode of keeping it clean, but by drilling and horse-hoeing their crops, then they may maintain, that the drill husbandry supersedes the necessity of bare fallow on strong wet clays, with equal effect as the turnip husbandry renders unnecessary summer-fallow on light dry soils. Here then we come near the cause of the dispute between the South and North Country Farmers. They are both inaccurate in the terms they make use of: the North Country Farmer says, we must fallow on clay soils: the South Country Farmer says, there is no necessity for it, as we can raise good crops without summer-fallow. But the question does not so much regard soils, as the climate; or, more properly speaking, the question cannot be decided, nor indeed, thoroughly understood, if the soil merely, independently of the climate, is taken into consideration.

On another point, the statement of the South Country Farmer is inaccurate and incomplete: he says, we do without bare fallow by drilling our crops: you in the North may do the same, and thus banish the summer-fallow. The North Country Farmer contends, that the use of drill crops will not constantly keep their land clean. Here fact seems opposed to fact: the soils are the same, as all strong wet soils are included: the superiority of the climate in the South of England may enable the farmers there to work their drill crops more regularly, frequently, and effectually, than can be done in the North; but this advantage, considered by itself, is but trifling: no hand or horse-hoeing can free even the spaces between the drills effectually from root-weeds: and on the soils under consideration, they can do nothing towards freeing the ground occupied by the crop from them. The seemingly opposing facts, therefore, would be totally irreconcilable, if the drill husbandry were the only thing on which the South Country Farmer rested, for keeping his land clean without a summer-fallow: but when it is added, that from the superiority of his climate, he is enabled to give his land nearly as complete a fallow, in all the operations of ploughing, harrowing, rolling, and gathering the root-weeds after the crop is off the ground, as the North Country Farmer can do, by keeping his land uncropt during a whole summer, the disagreement and apparent contradiction disappears. The only difference is, that the North Country Farmer not unfrequently finds the whole summer insufficient for the purpose of cleaning his land: while the South Country Farmer can almost every year, if he chooses it, clean his land after the crop is off, before the wet season sets in.

The climate, therefore, in conjunction with the soil, and not the soil merely, should be taken into consideration, whenever the question respecting the necessity of summer-fallow is discussed.

It may also be asked the South Country Farmer, when he

Digitized by Google

he would apply his manure, if he did not get his crops off before the middle of September, and had the almost certain prospect of rainy weather by the beginning of October? In the North of England, and in Scotland, this is often the case: the manuring could not be put off till the spring, and applied to the beans, as then there is sufficient difficulty and risque in getting this crop put in in time, even when the land does not require to be manured. Seasons no doubt occur, in which manure might be applied to the stubble in the autumn; and sometimes, but very rarely, when it might be got on at the beginning of March, in sufficient time for the beans: but these seasons are rare, and the system of agriculture of a country, ought to be suited to the common and not to the uncommon nature of its seasons: a departure from the regular system, and an approach towards the system of a more highly favoured district, is always practicable; but these deviations should never be allowed to occur so frequently as to alter the nature of the system itself.

It is now time to bring these observations to bear on the different clays of Surrey: on those which lie to the north of the chalk hills, summer-fallow might in a great measure be dispensed with; but with respect to the Weald clays, the experiment would be hazardous in the extreme. The clays in the North of the county are not nearly so retentive of moisture, nor rendered so cold and unfriendly to vegetation by it, as those in the Weald: they dry too, much sooner and more completely (and without being soured), than the Weald clays do. This arises partly from their better quality and greater depth: partly from their not lying so flat: but, perhaps, principally from their not being nearly so much overshaded and confined by wood. If the

Weald clays get thoroughly wet in September or October, there is very little chance of their being in a fit condition to sow with wheat that year: on such soils, therefore, the command of a complete season seems necessary to work them properly, and get the seed into a dry bed. In many parts, perhaps, of the South of England, such clays might be cropped with little or no summer-fallow, but in their flat unventilated situation, it should form a regular part of the rotation.

From the circumstance of the turnip husbandry having been regularly followed on the chalky and sandy loams for at least a century, it is to be inferred, that from such soils, a complete summer-fallow has been long banished. The extension of their culture to the heavy loams, and in some few instances to the clays of the Weald, has still further diminished the quantity of fallow: and the introduction of winter tares folded off or cut green, on the northern clays, by allowing the ground to receive a bastard or partial fallow, has perhaps banished the complete and regular summer-fallow, to as great an extent as it would be prudent to do it.

Before the regular return of alternate green crops on light land, and the same system, joined to the regular recurrence of summer-fallow, on strong lands, was regarded in its just and true light, what was termed *autumn and spring fallowing*, was much practised by the Surrey farmers. As it is our desire and our plan, wherever we can find materials to accomplish it, to contrast the old and less perfect mode of husbandry of this county, with the new and more improved, we shall briefly state the object which autumn and spring fallowing had in view, and the mode by which they were accomplished, before we proceed to detail the present management of summer-fallows: by this means of contrasting the two modes, the superiority of the present, and the consequent improvement of Surrey agriculture, will be evident.

The *autumn-fallow* was employed to clean the stubble land intended for wheat: as at that time, wheat often succeeded oats, the oat stubble land most frequently underwent the process of autumn fallowing. As soon as the land was cleared of the preceding crop, the ploughs, harrows, rollers, and *wrackers*, were set to work, and the ground was made as clean and fit for wheat, as it could be at that time of the year, and in such a short period.

The *spring-fallow* was generally employed as a preparation for barley: and indeed, in many counties, the barley crop is still considered as the cleaning or fallowing crop. The operations were the same as in the autumn-fallowing: the consequence was, either that land was incompletely cleaned, or that the sowing of barley was put off much beyond the proper time. The dung of course was generally applied during the autumn-fallowing, to the wheat crop.

At present, autumn and spring-fallowing are almost every where exploded, and the cleaning and manuring the land are seldom or never performed, except when it is summer-fallowed. The Surrey farmers, however, by no means agree respecting some of the first and most important operations of the summer-fallow.

With regard to the time, when the first ploughing should be given to clay land intended to be summer-fallowed, there are two opposite practices, supported by the judgment and the experience of farmers equally intelligent and attentive. Perhaps the greater number object to ploughing their clay land before winter: in support of their opinion and practice they reason thus:

1. Clay land, by lying in the stubble unploughed, during the winter, is kept much drier than if the surface had been moved: not only is it reasonable to suppose that a surface unbroken and firm, will throw off the rain more completely than an open and broken surface, but the fact that it is so, may be made very evident to any person who walks over a stubble field, and *attempts* to walk over a ploughed field, after the rainy season has fairly set in.

2. They alledge, that after the more indispensable and necessary operations of the wheat seed-time are finished, it very seldom happens, that the state of the weather will permit their clay lands to be ploughed up dry; and that to plough them wet would be more detrimental to them than any effects from the frost could be beneficial.

3. By leaving their clay lands unploughed during the winter, and giving them the first furrow in the spring, the ground turns up in large clods, by the exposure of which to the sun during the summer, the root-weeds are killed in the most effectual and easiest manner; whereas if the land had been ploughed before winter, it would at the second ploughing turn up like mortar, and never thoroughly recover its proper state. The advantage or propriety of turning up the land in such large clods, is another point on which the Surrey farmers differ, and which will be considered immediately.

On the other hand, the advocates for winter ploughing, while they allow that land unploughed will lie much drier during the winter, than land which has been ploughed, alledge, that this advantage is comparatively trifling, when the beneficial effects of the frost on clay land are taken into the account: such land, exposed to the frosts, will not only require less work during the following summer, but that work will be much more effectual than a greater quantity on land unploughed before winter.

With regard to the objection to winter ploughing, that it leaves the land in such a state that it cannot be worked afterwards with advantage, they alledge, that the proper and judicious laying up of land at the first ploughing will effectually prevent this. In a climate like that of Surrey, where most crops are off the ground by the middle of September, there remains sufficient time before the wet weather sets in, both to sow the wheat and to plough the stubbles intended for summer-fallow. That clay lands might be ploughed safely and with advantage before winter, is evident from the best practice of the North of England and of Scotland, where, from repeated trials, the summer-fallow of clay land, ploughed before winter, is always in better condition and much more forward, than that which has been put off till the spring. In these districts the harvest is later, the wet weather sets in sooner, and continues longer in the spring than in Surrey: they have clays at least equally strong, and there it is considered the sign of a slovenly or unskilful farmer, to delay ploughing his fallows till the spring. The advocates among the Surrey farmers for winter ploughing, would find their cause much strengthened if, as has already been advised, they would lay their clay lands in eighteen feet ridges instead of ten; and if, instead of constantly ploughing them flat, by alternate cleaving and gathering,

ing, they would give the crown of their ridge a considerable elevation above the sides, at least when the land is to lie ploughed or sown during the winter.

In defence of the practice, already alluded to, of breaking up their fallows into large clods, the advocates for it alledge, that it would be almost an endless and a very expensive trouble to gather all the couch-grass and other roots out of the land; and that by exposing the ground in clods to the whole summer's sun, the clods are completely baked, and every root-weed they contain effectually destroyed.

Those Surrey farmers who reduce their land, maintain, on the other hand, that one great object of summer-fallow, the promoting the growth of seed-weeds in order to destroy them, cannot be accomplished if the ground is left in clods, at least not nearly so well, as if it were made finer. To this it may be added, that even the destruction of root-weeds cannot be complete, unless we suppose (which certainly cannot be fact), that all the roots are enclosed within the clods: in a moist summer too, or in one that is not very hot and dry, some parts of the root-weeds will remain undestroyed, and of course the object of leaving the ground cloddy will be defeated; whereas, unless the summer be very wet, the root-weeds may be completely gathered off pulverized ground, and if the summer is wet, the cloddy fallow, with respect to them, is no better off than what is reduced, while it is much worse off in a moist summer, with respect to seed-weeds.

Besides, if the autumn prove very sultry and dry, the clods cannot be reduced in proper time, so as to enable the farmer to mix his lime or manure effectually with the soil: he must also wait for a much greater quantity of rain before he can sow his land, than the farmer who has already reduced his soil to a proper tilth.

The preceding observations will have let the reader into the knowledge of almost the only operation that can be carried on, on cloddy ground, during the summer. Whether the plough or the harrows be employed, their only use or effect must be to turn over the clods, and expose their different surfaces to the air and sun. In such a summer, for instance, as the last, the land could not properly be said to be ploughed: the clods were indeed moved about, and sometimes turned over, but this might have been done much more effectually and expeditiously by the harrows. The preceding description applies with particular propriety and force to some strong land, very full of immense clods, on which I saw some ploughs at work in the beginning of September, between Camberwell and Dulwich.

It may be objected, that *fine* land is by no means so well adapted for a crop of wheat, as land with a rough clod upon it: this is admitted; but on the other hand, the finer the land is made, the more effectually can it be cleaned and manured: the object of the farmer, therefore, should be to keep merely that degree of cloddiness on his fallow that will be sufficient for his wheat crop. When the advantage of reducing the soil was insisted on, nothing more was meant but that it should be reduced to that state, and not beyond it, which a wheat crop requires.

In detailing the different operations that are carried on by the Surrey farmers while their ground is under summer-fallow, there is little that deserves particular notice, either as peculiar to them, or as very commendable. As their lands in general lie flat, or nearly so, the crown and furrow are changed by the first ploughing;

ing; by the second, the field is either ploughed across or diagonally, according as its form makes it more convenient: the harrows, rollers, and *wrackers*, are then set to work: the third ploughing is also generally across. After the land has been again cleared of the root-weeds brought to the surface by the harrows, &c. it either receives another ploughing, or lies cross-ploughed till it is time to apply the lime or manure; after this is spread, the land is ridged up, or if it is a very wet soil, the ridges are formed before the lime or manure is laid on.

Most of the ploughings given to the fallow land, especially the cross-ploughing, are very deep on all the strong land that lies to the north of the chalk-hills: but on the pale tough clays of the Weald they seldom venture to plough very deep, scarcely two-thirds of the depth that is usual on the other clays: on these, one at least of the ploughings is generally nine inches: on the clays of the Weald they never touch the subsoil, which lies within five or six inches of the surface.

Very little of the clay land gets a proper and sufficient quantity of manure laid on it during the summer-fallow. In the Weald they seldom fail to apply lime; and on the north clays, chalk generally, and sometimes lime is given. When chalk is applied to fallow, from fifteen to twenty load is given, each load containing from thirty to thirty-five bushels. When lime is given, it is reckoned that a kiln, or eight loads, will lime two acres and a half well. In the neighbourhood of the Downs the fallows are dunged, by having the sheep folded on them at night. When a proper quantity of manure is given, ten or twelve tons of rotten dung per acre are not considered too much; but it does not often happen that the strong clays have such justice done them. In the Weald, what little dung can be made or spared, is constantly applied to the fallows.

This is the common method; but there are some farmers who pursue a very different one, at least in two respects: instead of leaving their ground that is ploughed before the frost, rough during the winter, they constantly harrow it: land left harrowed is more thoroughly soaked by the rain (though it is not very easy to perceive why it should be so); but, on the other hand, the growth of annual weeds, which are the great plague of the Surrey farmer upon almost all soils, is more encouraged. The other point on which the practice of some farmers differ considerably from the common method, is that of ploughing the land twice after the lime or dung has been applied. The objection usually urged against this practice is, that the manure will be buried by it; but by regulating the comparative depth of the two ploughings properly, this may be avoided, while the advantage is obviously great: the manure is thus more completely mixed with the soil, every part of the land has its proper portion, instead of its being divided unequally. There certainly is some mismanagement with respect to dung applied to land, among many of the Surrey farmers: a great part of it may be seen lying in lumps on the surface of the ground after it has received the last ploughing. This was particularly the case with many fallowed fields this autumn.

## SECT. III.—COURSE OF CROPS.

In a county like Surrey, where the soils are so very various, and where so little of system prevails, it is absolutely impossible, by any general observations or remarks, to give an adequate and just idea of the rotation of crops that prevails, even in any considerable district of the county. By the remark, that very little that has the appearance of system prevails in Surrey, we by no means intend to insinuate, that on the important subject of a judicious and proper rotation of crops, there is no preference given to one kind of rotation above another, or that this preference is not founded (at least among the most experienced and successful cultivators) on sound and enlightened notions of agriculture. All that is meant to be conveyed is, that local circumstances in many parts of the county, render frequent deviations from any general course of cropping necessary or profitable; and that in many other parts of the county, provided the principle which they regard as most important and advantageous is strictly and uniformly adhered to, the farmers are not very scrupulous in indulging in all the change and variety of practice which it will admit.

The local circumstances to which we have alluded, as setting aside or breaking in upon the acknowledged principles of judicions rotation, are the vicinity to London, or the possession of a soil that will admit of the successful culture of sainfoin. Omitting for the present the courses of cropping that are followed where either of these circumstances interfere, we shall proceed,

Digitized by Google

1st, To state the leading principle upon which the most judicious and successful course of cropping in the county of Surrey is grounded.

2d, The different and various practices that are followed in conformity with this principle; and,

3d, The deviations from this principle in those parts of the county, or amongst those farmers that still pursue the old and less commendable system.

As a bare statement of the order of succession which is followed in the arrangement of the different crops, is but little calculated either to enable the agricultural reader to judge of the merit or demerit of the rotation, or to do justice to those who pursue a proper course of cropping, it is deemed advisable to add a brief notice of the kinds and degree of preparation which each crop receives, as well as of the nature of the soil on which each rotation is respectively adopted and pursued. A more full and minute account of the preparation generally bestowed on each crop, falls more properly under a different head: a brief notice of it here will not occupy much room, and for the reasons already assigned, it seemed advisable to insert it.

Having offered these preliminary observations, in order to explain the course we mean to pursue, we shall now,

1. State the leading principle upon which the most judicious and successful course of cropping in the county of Surrey is grounded. This principle, which appears to be making its way, though perhaps but slowly, in most parts of the county of Surrey, has long been acknowledged and acted upon in the best cultivated districts in the kingdom; it is plain and simple: "That in no case, except under very particular circumstances, ought two corn or white crops to

succeed each other." This rule does not appear to have been followed long in any part of the county: the propriety and advantage of adopting it, arose most probably from considering the consequences that resulted from a mode of cropping which appears to have been long followed, and which is even yet by no means uncommon. Instead of the four-shift rotation on their turnip lands, of turnips, barley, clover, wheat, it seems to have been the universal practice formerly to follow a five-shift rotation, of turnips, barley, clover, wheat, oats: the oats, as may reasonably be expected, were in almost every instance a miserable crop; and the land after them was left not only much exhausted, but uniformly very foul and overrun with root-weeds. This could not fail to strike such as were observant and reflecting agriculturists; and who considered it as a more profitable, as well as a more enlightened mode of practice, rather to keep their land clean, and to ensure future good crops, than to purchase a miserable crop at the expense of impoverished and dirty ground. The remedy was easy and obvious: by striking off the oat crop, which succeeded their wheat, they immediately got into a rotation without any trouble or cross-cropping, at least as well calculated as any they could have adopted, by entirely changing their system, for all proper turnip soils.

Whether this great improvement arose and spread in the manner and from the cause we have just mentioned, or from whatever circumstance it arose, is a matter of comparatively little consequence; at present it is not only gaining ground, but along with the adoption of the four-shift rotation on light lands, the principle on which it rests, is also becoming better understood and more scrupulously adhered to, even on soils where that particular practice cannot conveniently or successfully be followed.

This principle, therefore, that two white, or corn crops, ought not to follow in immediate succession, may be regarded as the leading and directing principle among the best farmers of the county of Surrey; and though the number of them who follow it is still but comparatively small, yet as they are scattered in different parts of the county, as they are active and industrious, and not merely speculative farmers, and especially as the good effects of the principle upon which they cultivate their farms, is abundantly evident in the superior cleanness, and the more weighty crops which they display, we may reasonably expect that their example will spread over the county at large.

Another principle of less importance, and of more confined application, which, however, regulates the practice of a much greater number of the Surrey farmers in arranging their rotation of crops is, that barley cannot be advantageously or profitably sown on land that requires to be summer-fallowed.

This, at first sight, will appear rather a strange and unfounded maxim to a farmer of the North of England, or of the South of Scotland, who is accustomed to admit barley regularly into his rotation, even upon his strong, wet, clay lands, which he finds it necessary constantly to fallow every sixth year*. But it may justly be questioned whether, on all lands that are so stiff and wet as not to admit of a turnip fallow, the omission of the barley crop would not be advantageous; and when the enormous expense that necessarily attends preparing a barley crop on strong lands, in a county like Surrey, where four or five horses are constantly used on such lands, is taken into consideration, the wisdom of the principle which excludes barley from forming part of the rotation on summer-fallowed land, cannot be doubted.

---

* The common rotation on the lands in the Carse of Gowrie, which are a strong heavy clayey loam, and upon almost all the clays of East Lothian, is, 1. fallow, 2. wheat, 3. beans drilled, 4. barley, 5. rye-grass and clover, 6. oats.

With respect to the intermixture of green crops with their crops of corn, the farmers of Surrey have few general rules by which they abide. That a clover-ley is the best preparation (at least upon all light lands) for a crop of wheat, is perhaps the only general rule on this point to which they adhere with much strictness.

It may be proper to notice, before we proceed to specify the different rotations that are followed in conformity to the principle of intermixing green and white crops, that two or more green crops are frequently grown in succession, so that no general rule separates them by a white crop, in the same manner as two white crops are separated by a green crop. The propriety, or rather the economy, of thus taking two or more green crops in immediate succession, may justly be doubted, except in particular cases, or in the vicinity of a great town. If a crop of pease, which appears in every climate and in almost every soil, to be a very uncertain and precarious crop, can be secured by being sown on a clover-ley, this rotation may be adopted with propriety where pease are a paramount object: if, as is maintained by some of the most experienced farmers in Surrey, the worm, which generally destroys the oats that are sown on old grass when newly broken up, does not attack a crop of beans when sown in a similar situation, it certainly would be advisable to substitute beans for oats on old grass lands, when first taken into tillage; but with these, and perhaps some other particular and special exceptions, it seems throwing away the peculiar advantages of green crops, to have recourse to them in immediate succession.

A farmer who takes two or more crops of white corn, one after the other, is blameable, because by this means he renders his land poor and dirty, and injures both himself and the community. It appears to us, that a considerable loss is also sustained, wherever green crops are unnecessarily brought in; and that, if the situation of the land does not *require* two successive green crops, such a mode of cropping is unnecessary, and therefore prejudicial. We believe it will be allowed, that green crops do not pay so well as crops of corn, except near large towns; and that their introduction may, properly speaking, be regarded as an evil, but a necessary evil, in order to prevent the existence of the greater evil of a bare fallow. A crop of wheat pays better than any other crop; and if crops of wheat, equal to such as are raised now after clover or summer-fallow, could be raised every year, with no more expense or trouble than they now require, every farmer would be eager to raise them: as that, however, cannot be effected, inferior crops are raised, or the land is left without a crop: wherever, however, these can be avoided, they should. Turnips have taken the place of bare fallow on light land: beans and tares have rendered bare fallow less frequently necessary on strong lands. Thus the evil or disadvantage of being obliged to leave a portion of land every year without a crop, is in a great measure done away; but to bring in summer-fallow, where it was not necessary, would justly be deemed voluntarily recalling the evil from which we were freed; and to have recourse to green crops unnecessarily, must be considered as acting with a want of economy similar in nature, though not so great in degree, except in those cases and situations where one green crop succeeding another, will pay better than if the green crop had been succeeded by a crop of corn.

In defence of this practice it is urged, that a succession of green crops will keep the land clean and in good condition: but it may be remarked, that if the land be well ploughed and harrowed, and if these operations be performed frequently, and at proper seasons, a green crop every other year on light lands, and the occasional introduction of a complete summer-fallow, on strong lands, will effectually keep the land clean and in good condition. If the land is foul or poor, green crops are more likely to leave it more so, than to remedy these evils: no stubbles were in a worse condition this autumn (1807), in the county of Surrey, than the bean stubbles. Besides, it may be asked, for what purpose is the land to be made and kept so very clean, and in such high condition (allowing for argument's sake, that a succession of green-crops will keep or make it so)? certainly for no other purpose but that advantage may be taken of its good condition, to raise crops that will pay the farmer well. What possible wisdom or benefit can there be in always keeping your land in such high condition, that it would easily bear a white crop for every green crop, and yet in never taking advantage of this high condition? It is undoubtedly wrong to exhaust land by over cropping, but it is as certainly an evil, though of a different nature, not to crop land up to what it will bear without being injured. Green crops, as has already been remarked, are like fallows: they are indispensable to the production of white crops, not of themselves desirable, at least, when compared with crops of corn: it is found that an alternate succession of green crops, if a farm is managed well in other respects, is abundantly sufficient to ensure good crops of white corn, and at the same time to keep the land clean and in good heart: to have recourse, therefore, to a succession of green crops, is either unnecessary, if the object be to keep the land clean, or worse than useless, if the object be to make it clean.

It seemed more proper to offer these general observations on the different principles that regulate the courses of cropping pursued by the Surrey farmers, than to urge detached objections to any of the particular rotations: in some few instances, however, we shall take the liberty of offering particular remarks, in addition to those we have already stated.

We now proceed to give the different rotations that are followed in conformity with the principle, " That two white or corn crops ought not to follow in immediate succession."

Omitting for the present those parts of Surrey, where the vicinity of London renders it advisable to mix the garden culture with the management of the farm, or where the farm crops are regulated by the demands of the London market, we shall mention the different rotations that are followed.

1. On the chalky district.
2. On the sandy loams, and other turnip soils.
3. On the richer and deeper clays to the north of the chalky districts.
4. On the pale and poorer clays to the south of the chalky districts in the Weald of Surrey; and
5. On the " black land."

### 1. *On the Chalky District.*

It has already been noticed, that the soil upon the chalk is in general, either a red strong clay; a thin flinty clay; or a hazel loam of different degrees of depth: on the southern and more precipitous side of the chilk-hills, the soil is in many places almost entirely pure chalk: this, however, in general, is cropped much in the same manner as the strong clay that is incumbent on the chalk.

On the strong land, incumbent on chalk, the soil in general thin; near the chalk, very full of flints. Between Croydon and Godstone:

1. Fallow, folded with sheep, ploughed four or five times;
2. Wheat;
3. Beans, generally broad-cast;
4. Oats, twice ploughed for;

or,

1. Turnips, land ploughed four or five times and dunged;
2. Barley, land ploughed twice;
3. Clover, cut and fed off;
4. Oats, or wheat, land folded or dunged, if for wheat;

or,

1. Fallow, folded or dunged;
2. Wheat;
3. Pease, the land skim-ploughed, trench-ploughed, and sometimes rafter-ploughed in the autumn; then ploughed again in the spring: the pease generally broad-cast;
4. Tares, generally fed off: sometimes left for seed;

5. Oats, if the tares are left for seed: wheat, if they are folded off.

At Effingham-hall, cold thin clay on chalk, very flinty; some more kindly or lighter land. On the light land:

1. Turnips, dunged;
2. Barley;
3. Clover, cut for hay; then rag-fallowed and dunged for,
4. Wheat.

Between Sutton and Riegate; soil, thin clay on flinty chalk:

1. Fallow, dunged;
2. Wheat;
3. Pease;
4. Tares, cut green, or folded off;
5. Rape, or turnips folded off;
6. Barley;
7. Clover, mowed; then left, in favourable years, for seed; in other years, fed off;
8. Clover, folded off; second crop ploughed in for,
9. Wheat.

Between Leatherhead and Guildford, soil, clay and loam of various staple on chalky rubble:

1. Turnips or rape, folded off;
2. Barley;
3. Clover, dunged or folded for,
4. Wheat, if the clover was dunged or folded; or oats, if not.

*General Remarks.*—The preceding are some of the best rotations on the different soils incumbent on chalk. Perhaps, where the upper soil is sufficiently light and open for turnips, no rotation can be devised more calculated to secure good crops, and to preserve the land in proper condition, than that of turnips, barley, clover, wheat. A farm on the chalk under this management, with a proportionate quantity of land in sainfoin, must, with any thing like proper attention to the various operations of ploughing, &c. which on these soils can be carried on with little difficulty or labour at all times of the year, be profitable to the farmer and advantageous to the community. Perhaps upon the deepest and richest of the hazel loams incumbent on chalk, the wheat crop might be brought about more frequently than once in four years: this Mr. William Hall, of Ewel, is endeavouring to effect; and from what he has already done—from his freedom from prejudice, his judgment and attention, joined to the favourable nature of his soil—we have little doubt but he will succeed in his attempt.

It is more difficult to suggest any advantageous alteration in the mode of cropping the clays incumbent on chalk, whether deep and strong, or thin and shallow, especially where flints abound, if, as I was informed, and as might naturally be supposed, beans are a precarious crop on these soils. Where the soil is not very strong, is tolerably free from flints, and has such an inclination as keeps it tolerably dry, perhaps the following rotation is the best adapted both to it, and to the keeping of a flock of sheep:

1. Turnips;
2. Oats;
3. Clover, dunged for,
4. Wheat.

This rotation, with a proportionate quantity of clean and healthy sainfoin, would probably be found to answer better than a rotation into which more crops were intro-

Digitized by Google

introduced. The only difficulty or objection that occurs to it, respects the turnips. It may justly be questioned, whether on lands at all inclining to be wet, especially if they are strong also, turnips are at all profitable. Farmers on such lands say, they must have turnips, or some other crop of a similar nature, for their sheep; but it deserves more attentive and impartial inquiry and calculation than it has hitherto received, to determine whether, all things being taken into the account, sheep are profitable on a farm that has no dry, sound turnip land, especially if such a farm is also without any quantity of permanent pasture or meadow.

On the strong and comparatively deep red clay, which is not unfrequently found near the lowest part of the chalk-hills, on their southern side, and which sometimes occurs on the flat of the chalky ridge, as is the case immediately after you pass Walton-heath, and just before you come to the bare chalk-hill which overlooks Riegate; on such soils wheat might certainly be taken with safety and advantage very frequently, and, as their greater depth and soundness fits them better for beans than the thinner clays, tares, beans, and clover, might be alternately grown between the wheat crops. Fallow should occasionally occupy the place of one of the green crops, and if, as there is some reason to fear, it was found that the wheat did not thrive well after the clover-ley, oats might be substituted. The only objection that occurs, and it is an objection that lies against every course of cropping such lands, is the difficulty and expense of carting to and from lands in such a situation. They should therefore be kept in sainfoin as much as possible.

2. With regard to the rotations that are followed on the sandy loams and all the other turnip soils, not incumbent on chalk—the former soil is found the whole breadth of the county between the chalk and the pale clay of the Weald: it also occupies, mixed with heath, the whole south-west and west part of the county; and it forms the greater part of the north and north-western divisions.

At Godalming, on the rich and early sands, the rotations that are conformable to the maxim, "That two white or corn crops should not immediately succeed one another," are,

1. Turnips, dunged, carefully hoed twice, and folded off;
2. Barley, with one or ploughings;
3. Clover, dunged or dressed with peat-ashes, or both, for,
4. Wheat;

or,

1. Turnips, managed as before;
2. Barley, the stubble twice ploughed for,
3. Pease, dunged for,
4. Wheat;

or,

1. Turnips, dunged for,
2. Barley;
3. Clover, dunged for,
4. Wheat;
5. Pease.

About Guildford, Send, Ripley, and some of the neighbouring parishes, the pease are generally drilled..

About Cobham, on the loam, the following rotation is sometimes followed:

1. Turnips;
2. Oats;
3. Clover;
4. Wheat.

In

Digitized by Google

In short, on all the loams about Godalming, Dorking, Riegate, Godstone, Chobham, Ockham, Send, Woking, &c. the excellent rotation of turnips, barley, clover, wheat, is found to prevail more or less: the deviations from it, which introduce two white crops, will be noticed hereafter, at present we shall merely remark, that it is the object of many farmers to get a "stolen" crop of pease after their wheat, or in other words, to put off the necessity of dunging till another year: where the land is clean and in good condition, the soil naturally very good, and the crop of pease abundant, they might venture to sow wheat after the pease without dung, with very little risk of being disappointed of a crop, or of leaving the land foul.

The only variation from the four-shift rotations, already mentioned as prevailing on the loams, that does not go against the principle of good farming is, where, by the turnips being fed off by the beginning of November, wheat instead of barley is taken after them: this is sometimes done about Send, Ripley, Woking, &c. The rotation then stands thus:

1. Turnips;
2. Wheat;
3. Clover;
4. Pease, drilled;
5. Wheat;

or,

1. Turnips;
2. Wheat;
3. Clover;
4. Wheat or oats.

Between Godalming and Haslemere the rotation is frequently lengthened out in the following manner:

1. Fallow, dunged for,
2. Wheat;
3. Turnips, folded off;
4. Barley;
5. Clover,

Digitized by Google

5. Clover, mowed and folded off;
6. Wheat;
7. Pease or beans, drilled and hand-hoed;
8. Oats;
9. Tares folded off;
10. Wheat, drilled or broad-cast.

The turnips are not often dunged for, as a crop of rye for spring feed is commonly sown between them and the wheat, which, by being folded off, is considered as a sufficient preparation for the turnips.

Most of the preceding rotations prevail equally on what may be deemed the sandy loams, and on loams in which there is a considerable proportion of clay, provided they are sufficiently dry and friable for turnips.

3. The rotations that are followed on the deeper and richer clays, such as prevail between the northern termination of the chalk-hills, and the boundary of that district where the influence of the London markets extends; or such as are found intermixed with the loams about Chobham, Cobham, Send, &c.; or such as are found in narrow stripes on the south side of some parts of the sandy hills that run parallel to the chalk, before we come fairly to the pale clays of the Weald—are the following.

On the strong land to the north of the road between Leatherhead and Guildford, near Clandon:

1. Turnips, drawn and fed off on the ley;
2. Oats;
3. Clover, dunged or folded off, for,
4. Wheat.

This, however, is not a very common course. Sometimes:

1. Tur-

Digitized by Google

1. Turnips, drawn;
2. Oats,
3. Clover,
4. Pease, stubble dunged for
5. Wheat.

On the strong land below Guildford:

1. Fallow,
2. Wheat,
3. Beans,
4. Oats.

About Cobham and Send, many of the best farmers endeavour to have wheat every second year upon their best strong land; the alternate crops are, tares, folded off; beans, and clover: the land is always dunged for wheat, except after the tares. Some of the strong land in these parishes is cropt thus:

1. Fallow,
2. Wheat,
3. Beans.

These are the most common *good* rotations on the northern clays: some farmers, who think that wheat after clover-ley, on such soils, does not answer well, take beans or oats instead of that crop.

4. An adherence to the grand principle of a good rotation, is less frequently met with in the Weald than in any other part of the county. Where farmers have many difficulties to struggle with, and have an inadequate capital (as is too often the case in the Weald), they are too apt, and, indeed, too much under a strong and tempting necessity, to prefer a small, and often only an apparent advantage, to a greater distant good that must be purchased at an immediate expense, which they can little afford to defray.

The least exceptionable rotations which are practised by some farmers in almost every part of the Weald, are the following:

In the neighbourhood of Horley:

1. Fallow, always limed, and manured with what little manure can be spared for it;
2. Wheat,
3. Clover,
4. Oats.

Upon the darker coloured and better Weald soils:

1. Beans, broad-cast or planted;
2. Wheat,
3. Clover,
4. Oats

About Horne and Burston, and on some farms about Horley:

1. Fallow,
2. Wheat,
3. Beans,
4. Oats.

In other parts of the Weald, the following rotations are commonly followed, which, though they do not bring two corn crops together, are yet objectionable on another score:

1. Fallow,
2. Wheat,
3. Clover, two or three years; mown the first, and sometimes the second year, but more generally pastured the second and third years: then rag-fallowed for,
4. Wheat;

or, on some of the drier spots,

1. Turnips,
2. Barley,
3. Clover,
4. Wheat.

The objections to the first of these two rotations are, that more is lost by keeping such land two or three years in grass, than can possibly be made or saved by the stock it will maintain, or by not being obliged to plough and sow it: on such soils, the sown grasses begin to leave the land even in the second year: if it is thought proper, therefore, to keep them more than one year in grass, they should be suffered to lie till the grasses natural to them take the place of the sown grasses. But the case really is, that at the end of three years they are ploughed up, not because the land is then considered in the best state for the subsequent crops, but because, from the decay of the artificial grasses it will no longer keep any stock. With respect to the second rotation, of turnips, barley, clover, wheat, it may be observed, that turnips never can equal in profit, a bare summer-fallow on such soils, when either turnips or summer-fallow are necessary to *make* the ground clean, nor a crop of drilled beans, if the object be to *keep* the ground clean. Barley too, on such soils, if they must be brought into proper tilth for it at the expense of four or five horses to a plough, is too dearly bought: and wheat, though it may answer on the more kindly clays in the northern parts of the county after clover ley, will seldom in the Weald pay so well, nor leave the ground so clean as a crop of oats.

5. The extent of the "black-land" is too trifling to admit of a great variety of rotations: besides, a considerable proportion of it is in permanent grass, from the conviction, that if the expense of working it be taken into the account, it pays better in grass than in corn. The only rotations that kept two white crops separate by a green crop, of which I received any account, are,

1. Fallow, seldom dunged, and not very often limed;
2. Wheat,
3. Beans;

or,

1. Fallow,
2. Wheat,
3. Beans,
4. Wheat;

or,

1. Fallow,
2. Wheat,
3. Clover, dunged for
4. Wheat.

To the first of these rotations, the same objections lie that have been already urged against bringing two green crops immediately after each other. As beans should never be sown, except they are put on clean land, they in every case will admit of, and indeed will prepare the way for a succeeding crop of corn. It is impossible that such land as the "black-land" can require a bare summer-fallow every third year, especially if the two intervening years have produced only one white crop.

III. Before proceeding to state the rotations pursued in the different parts of Surrey, that go against the fundamental maxim of agriculture, by bringing two white or corn crops immediately together, it is proper to premise, that the rotations already mentioned, are by no means the most common in the several districts where they are said to be followed. There is perhaps, a greater variety of rules and practices, even within the compass of a single parish in Surrey (if the Weald be excepted), than in most of the other counties in England: so that the practices adopted by one farmer are frequently very different from those of his nearest neighbour. The judicious and commendable rotations already noticed, are to be found in a more or less extensive degree, in the several districts specified along with them, and there is good reason to believe they are becoming more prevalent; but whoever from this account should expect to find that practices directly opposite

Digitized by Google

posite were banished from these districts, would be much disappointed. Even on the hazel loams, near the northern extremity of the chalk, and on the sandy loams—soils where a judicious system of cropping might most easily be introduced, and where, from the introduction of the turnip husbandry, the common excuse for taking one white crop after another, viz. to make up for the loss and expense of a summer-fallow, cannot be urged; even on these soils, the following rotations are too common:

1. Turnips,
2. Barley,
3. Clover,
4. Wheat,
5. Oats.

1. Turnips,
2. Barley,
3. Clover,
4. Wheat,
5. Barley,
6. Tares, folded off;
7. Turnips,
8. Barley, with sainfoin.

I was informed that the following reprehensible rotation was sometimes even yet followed between Dorking and Riegate, on the sandy loams:

1. Turnips,
2. Barley,
3. Clover, dunged for
4. Wheat,
5. Oats, stubble dunged for
6. Wheat.

On the strong lands, the following faulty rotations are found.

About Cheam:

1. Fallow,
2. Wheat,
3. Clover,
4. Oats, stubble dunged for
5. Wheat.

About Stoke:

1. Fallow,
2. Wheat,
3. Oats,
4. Beans.

In the patches of strong land near Compton :

1. Tares folded off, rag-fallowed and limed ;
2. Wheat,
3. Oats.

On the black land.

1. Fallow, seldom dunged ;
2. Wheat,
3. Oats.

In different parts of the Weald :

1. Fallow,
2. Wheat,
3. Clover, two years ;
4. Oats,
5. Oats ;

or,

1. Fallow,
2. Wheat,
3. Oats ;

or,

1. Fallow,
2. Wheat,
3. Oats,
4. Clover, two years ;
5. Wheat, or oats.

It will be seen from the above rotations, that a fondness for oats after wheat, is the sin that most easily besets the Surrey farmers. As barley is almost proscribed from their strong and wet soils, and naturally takes its place after turnips on the lighter soils, it does not often happen that it is taken after wheat. Wheat is sometimes taken after oats ; but I heard of but one solitary instance of wheat after barley. Oats after barley, or barley after oats, are rotations not common.

The rotations are sometimes lengthened to eight or ten crops, and what is rather singular, in many cases, the first part of the rotaion is strictly according to rule, while the latter part deviates from it ; for instance,

1. Turnips,
2. Barley,
3. Clover, dunged for
4. Wheat,
5. Oats,
6. Pease drilled,
7. Tares, folded off, rag-fallow for
8. Wheat.

Here the rotation might easily be improved, by putting the pease between the wheat and the oats.

In all the preceding rotations the winter, or half-crops, have been omitted, as the object was to shew as clearly as possible, the order in which the crops that occupy the ground the greater part of the year succeed one another: the winter crops are stubble turnips, rye, and winter tares: these are generally sown on the land that is intended for summer turnips (except in the case of winter tares sown on land intended to be summer-fallowed), and are to be met with more or less in every part of the county, except the Weald; there they seldom are introduced. Rye, and stubble turnips, are more frequently and generally grown on land meant for summer turnips than winter tares are, since they are got off the ground sooner.

Little remains to be said respecting the rotations followed on the farms that lie within the influence of the London markets, as cabbages, turnips, potatoes, or green pease, are in such situations the great object; the other crops must make way for them whenever they can be conveniently and profitably introduced. Within eight or ten miles of London, towards Sutton and Ewel, the following rotation prevails, with occasionally a few trifling variations:

1. Fallow, dunged;
2. Wheat,
3. Oats,
4. Tares,
5. Turnips, dunged;
6. Beans, stubble, dunged

and ploughed once or twice, for
7. Wheat,
8. Pease,
9. Oats,
10. Turnips, dunged;
11. Barley,
12. Clover, dunged for
13. Wheat.

The tares and clover are cut and bunched for the London market; the first crop of turnips are sold to be drawn off; the second are fed off; the pease are gathered green.

We shall conclude this important subject, with briefly stating what we conceive would be the most advantageous rotations for the different soils and situations in Surrey.

On the good potatoe soils near London:

1. Potatoes, well dunged;
2. Wheat,
3. Clover, lightly dunged for
4. Wheat.

This rotation we have known followed with great success on the loamy soils in the neighbourhood of Berwick.

On the rich clays to the north of the chalk-hills:

1. Tares, folded off, a rag-fallow for
2. Wheat,
3. Clover, dunged for
4. Wheat,
5. Beans, drilled or planted, dunged for
6. Wheat, with the occasional substitution of a summer-fallow instead of the tares, and of oats instead of wheat after the clover.

On the poorer and wetter clays in the Weald:

1. Summer-fallow, limed and dunged;
2. Wheat,

Digitized by Google

3. Clover,
4. Oats.

On the drier and richer clays in the Weald:

1. Summer-fallow, limed;
2. Wheat,
3. Clover,
4. Oats, stubble ploughed twice or thrice and dunged;
5. Beans, drilled;
6. Wheat.

On the sandy loams, and the thinner loams on chalk:

1. Turnips, drilled, dunged, hand and horse-hoed;
2. Barley,
3. Clover, dunged for
4. Wheat.

On the richer sandy loams, and on the hazel loams:

1. Turnips, as before;
2. Barley,
3. Clover, slightly dunged for
4. Wheat,
5. Pease, stubble dunged for
6. Wheat.

On the deeper and stronger loams:

1. Turnips,
2. Barley,
3. Clover,
4. Wheat,
5. Beans, drilled, stubble dunged for
6. Wheat;

or,

1. Turnips,
2. Wheat,
3. Beans,
4. Barley,
5. Clover, dunged for
6. Wheat.

It is necessary to add, that the mere intermixture of
green

green crops, even though manure is frequently applied, will not keep the ground clean and in good condition, unless it be worked *well*, *with judgment*, and *at proper seasons*. The intermixture of green crops, the frequent application of manure, and such a climate as Surrey enjoys, will do much to support the land under the rotations that have been laid down, but all these will be insufficient, if the other important rules are not attended to.

## SECT. IV.—WHEAT.

THERE are several circumstances, which render the cultivation of wheat in Surrey more general and extensive than it is in many other counties. In the first place, the soil of the Weald, or vale land, which forms no inconsiderable proportion of the county, is of such a nature as to require frequent summer-fallowing: where this is necessary, the farmer must have recourse to wheat, in order to pay him for the want of a crop, and for the great expense that he has incurred; and as lands which most require a summer-fallow, viz. strong wet clay, are peculiarly adapted for wheat, the farmer is led also by this consideration to sow this grain very extensively. In the second place, the general rotation on the light lands brings in a crop of clover after turnips and barley, and of course these lands, which were long deemed unsuitable for wheat, by receiving this crop on a clover-ley, are found to be as productive of this valuable grain as soils of a stronger class. Lastly, the great command of manure which that part of Surrey that lies near the metropolis or the Thames possesses; and the cheapness of chalk and lime in the other parts of the county, no doubt, induce the farmers to introduce a wheat crop more frequently than they would do if they were not possessed of these advantages. Except on certain soils, or in some very peculiar situations, the arable farmer must always look to his wheat crop to repay him for the greatest part of his expenses. This superiority of a crop of wheat to other crops, is much increased in Surrey by the vicinity of the metropolis, in which, if the grain be of good quality, it will always command a very high price, without danger of overloading or lowering the market, and in which, not merely the grain but the straw also, is a source of considerable profit.

All these circumstances of soil; of a particular rotation, where soil is not naturally so favourable; of a command of manure, and of the best market in the kingdom, have operated to extend the culture of wheat in Surrey. What the extent of land annually under wheat amounts to, it is impossible to ascertain; and on this, as well as on other topics where there are no grounds for forming a statement or opinion, I shall not hazard a random, a useless, and perhaps worse than useless conjecture.

I. *Preparation.*—This of course depends on the preceding crop. Wheat in Surrey follows, 1. a complete summer-fallow; 2. a bastard-fallow after tares, clover-ley, or woad; 3. beans or pease; 4. clover-ley; 5. turnips; and sometimes, but very seldom, it follows oats.

1. The operations of a summer-fallow intended for wheat, have been already noticed. As the soil that undergoes this operation is uniformly strong and moist,

it is repeatedly ploughed, harrowed, and rolled, but so as not to break down the clods too much; and previously to the last ploughing (generally in the latter end of August or the beginning of September), it is brought into a proper condition to receive the manure or lime.

2. A plain and complete summer-fallow is giving way, in the northern parts of the county (where the clays are of a better quality than they are in the Weald), to a bastard-fallow. This succeeds tares, clover-ley, or woad. For the first, the stubble of the preceding crop, after being manured or not, according to circumstances, is broken up, as soon after harvest as more important labour will allow, and the ground is sown with winter tares. If these are fed off with sheep in the spring, or if the ground had been manured for them, the preparation for the wheat crop consists merely in repeated ploughings, &c. after the tares are off; if the tares were sown without manure, and are cut to be eaten in the stable, manure is sometimes laid on for the wheat; though not unfrequently, the clays in the north of the county are so hardly dealt with, as not to receive any manure. Where the clover has lain two or three years, or where, though the first crop, it is not intended to let it stand after the first cutting, a bastard-fallow of three or more ploughings is given for wheat. Woad, which is grown on the thin lands near Banstead, is reckoned an excellent preparation for wheat: as it is generally pulled in July, and the ground has carried only a crop of turnips and barley before it, there is sufficient time, after this, to get the land ready for this grain. In fact, the preparation for wheat after tares, old clover-ley, and woad, can be regarded in no other light than as an incomplete fallow, which, where the ground is not very foul, and in a climate

where the weather does not break early in the autumn, may answer very well.

3. Much wheat is sown on the strong land after beans, especially where they have been planted; and some wheat is sown after pease, both on the light and strong soils. The more attentive and intelligent farmers generally double-plough their bean and pea stubble; the first furrow, either with a common plough held very shallow, or with a skim-plough, is for the purpose of burying the weeds: the second ploughing, of a greater depth, raises a mould completely free from weeds. Many farmers, however, content themselves with one ploughing after beans or pease.

4. There is perhaps more wheat sown after clover-ley of one year old, than after any other preparation, except bare summer-fallow, in this county. The most general mode is, to plough the *ley* once in the month of September, or as soon afterwards as the moisture will admit its turning up in proper tilth. Some farmers, however, rafter-plough their clover-ley towards the end of August, or beginning of September: they let it lie in this state for some weeks, then tear it about with a pair of heavy harrows, and give a complete furrow. Clover-ley is found to answer best for wheat on light land; tolerably well on strong land, if it be dry; and but very indifferently on strong wet land. The wheat does not succeed so well on clover and rye-grass mixed, as on pure clover.

5. Wheat is seldom sown after turnips. There are several reasons which prevent the Surrey farmers from following this rotation. Spring wheat is of inferior quality; and therefore in a county where quality is of such consequence in wheat, it is very little cultivated: on this account, and because barley of excellent qua-

lity and in great abundance is a sure crop after turnips, wheat is very seldom sown where the turnips stand till the spring. The Surrey farmers are not fond of using their turnips early in the winter: if they draw them, they consider the soil as impoverished to a greater extent of loss, than the superior value of a wheat to a barley crop will compensate for; and if they sell them to be eaten on the ground time enough for winter wheat, their value is little or nothing. Where, however, wheat is sown after turnips in Surrey, it is after turnips that have been eaten off in November: the ground is then ploughed once.

II. *Manuring*.—In the Weald, stable and yard dung, and lime, are used for the summer-fallow: on the clays in the other parts of the county, the same kind of manure, and lime or chalk, are used; though, as has been already remarked, these clays get by no means their proportion of manure. Sheep are folded on the fallows in some parts, especially where there is a portion of Downs attached to the farm. Five hundred sheep will manure an acre in about seven days. Clover-leys are sometimes manured in the spring; sometimes in the autumn, just before they are ploughed; and sometimes, instead of manure being spread upon them, sheep are folded on them, either before they are ploughed or afterwards. The quantity of each kind of manure commonly laid on the different kinds of soil, will be fully considered under the article *Manure*.

III. *Season*.—The usual months for the wheat seed-time are October and November: in some parts of the county, and in some seasons, a considerable part of the wheat is put in during the month of September—very little is sown after the middle of December; but on the whole, in most soils and seasons, the first fortnight of October is found best adapted for sowing wheat. Perhaps many of the Surrey farmers would sow their wheat earlier than they do, especially on cold backward soils; but in many seasons the ground is so dry, that there would be no chance of the seeds vegetating; and where it is to be sown on clover-ley, the ground is so hardened, that no plough can enter into it so as to make good work.

IV. *Putting in.*—Wheat is either sown broad-cast on the furrow; sown, and then ploughed in; or drilled. On clay land, the practice of ploughing the wheat in, or sowing under furrow, is gaining ground: it is said, by this mode, to take a stronger and deeper hold of the soil before the frost sets in, and therefore not to be so liable to be thrown out as when it is sown on the furrow. In the Weald, however, the practice of sowing under furrow is not much followed or approved of; perhaps from the dread of new practices, which prevails there—perhaps from a trial of its inefficacy or bad consequences.

Drilling wheat is not much followed; it is to be met with chiefly in the western parts of the county, about Bagshot, Send, Chobham, Ripley, &c. and on one or two farms in the south-eastern part. Two rows, about a foot apart, are generally drilled at once, the ground having been previously rolled, if the wheat is to be sown on summer-fallow: after the seed is sown, the ground is harrowed, and again rolled; but if it be clover-ley, the first rolling, previons to the sowing, is dispensed with. Dibbling of wheat is no where practised in the county, as far as I could learn.

V. *Sort.*—In almost every part of the kingdom, the kinds of wheat commonly sown and most in repute, are frequently changing—partly from the introduction of better kinds, and partly from the influence of opinion or fashion. The different varieties of wheat that at present prevail most in Surrey, are the following, classed according to the degrees of their goodness*:

*White Wheats.*—1. *White Dantzic.*—This kind of wheat has been grown in Surrey between 20 and 30 years: it is found in every part of the county, more or less; but perhaps is more generally grown in the Weald than in any other part.

The ear is small, and covered with a soft velvet down. In rainy climates, this might render it apt to continue moist, and prevent it from being fit to harvest as soon as some other kinds: but in a dry climate, it is no disadvantage; and in a windy season, it prevents it from shaking. The grain is very small and translucent: it is apt neither to be affected with the smut, nor to lodge. In very dry seasons, it is rather too flinty. The general weight of the bushel is from 62 to 63lb. Four quarters and a half is a great crop, on land well prepared. From the smallness of the grain, one bushel and a half is sufficient seed, on good and well-prepared land, per acre. The bakers prefer the flour of the white Dantzic, to that of any other kind of wheat—from a sack of it they often get one or two quartern loaves, more than from a sack of any other kind of flour.

---

* For this particular and accurate account of the different kinds of wheat, &c. of Surrey, I am indebted to the extensive information which my friend, Mr. William Hall, of Ewel, possesses on this, as well as on all other subjects connected with the agriculture of his native county.

2. *Taunton Dean.*—This kind of wheat has been grown in Surrey about five years; it was brought into this county from Essex, where it is said to have been saved from a single stem, and to have come originally from Taunton Dean, as its name imports, though now it is totally different from that grown at Taunton Dean. It is spreading fast over Surrey: a good deal of it is annually sold for seed into Scotland, and, what is singular, into Essex.

The Taunton Dean wheat has a square or club ear, which is largest at the top: there are generally four corns a-chest, and not unfrequently six. The chaff is thin and smooth: the grain is small and round. It stands better than any other kind. The straw, though apparently not so bulky as that of the preceding sort, weighs very heavy. Five quarters are an excellent crop. The weight of the bushel, if the wheat be very good of its kind, is about 61½ lb. It requires from two bushels to two bushels and a half to seed an acre. The flour of the Taunton Dean is the strongest of any, next to that of the white Dantzic.

3. *Old Whites, or Hertfordshire Whites.*—This kind of wheat has been grown in Surrey a very long time. The ear is long, and rather pointed; the chests are further distant than those of the former kinds; the chaff is thin; the grain is large, and rather long; the quality very good. The old white wheat is more apt to lodge than the former kinds, as the straw is not so stiff. It weighs from 60 to 61 lb. per bushel. A load, or five quarters, per acre, is a very great crop. The seed usually given per acre, where this kind is sown, is two bushels and a half.

4. *Red-chaffed or Red-strawed White Wheat.*—This has been also sown a very long time in Surrey. The

chaff is thin; the ear long, and rather pointed; the quality very good, though the colour in general is inferior to that of the preceding kinds. The straw is long in the joint, which renders it apt to lodge. It suits inferior soils better than any of the preceding kinds, as approaching more nearly the nature of brown wheat. As it ripens earlier than most other sorts, it is best adapted for late sowing. Its common weight is 60 lb. per bushel. Two bushels and a half are the usual allowance of seed per acre.

5. *Great Velvet.*—This kind has been very lately introduced into Surrey. The ear of it is very large: the grains are apt to be hollow, "troughy," or channelled—that is, the seam in the grain is apt to be deep, and the sides or lobes are not rounded and plumped out so much as in most other kinds of wheat. The great velvet is most apt to be affected with the blight. The grain is often "cold," or, in other words, it wants that dry, firm feel—that flinty quality—which is so acceptable to the millers and bakers. In quality, it is worse than any of the preceding kinds; but in abundance, it compensates in some measure for the badness of its quality: very large crops of it are not unfrequently grown, even as high as six quarters. The usual weight of the bushel is from 58 to 59 lb. The quantity of seed sown on the acre, the same as the red-chaffed white.

6. *Hedge Wheat.*—In some respects, this kind of wheat deserves to be reckoned next to the old or Hertfordshire whites; but there are other circumstances attending it, which much diminish its value; and these circumstances seem to have operated so generally and powerfully, as to render the sowing of it much less common now, than it was some years ago.

This wheat is said to take its name from having been originally found in a hedge in Sussex. Its good qualities are, that it is thin-skinned; its chaff is also thin; the quality of the flour it yields is good; and it is in considerable repute with the millers:—but, on the other hand, it is very apt to be smutty, and does not stand nearly so well as the preceding kinds; it is also very tender, and requires a warm and kindly soil. On these accounts it has given way, within these few years, to the preceding kinds, as being more certainly good in the quality, and more certainly abundant on most soils.

The ear of the hedge wheat is rather long: the grain is round like the Taunton Dean, but rather larger. The common weight of the bushel is 60 lb.: four quarters and a half are reckoned a great crop of this species of wheat.

*Brown or Red Wheats.*—The brown or red wheats are seldom or never sown in Surrey, where the soil and climate promise a tolerably good crop of white wheat: the culture of them is principally confined to the high grounds, especially those parts of the Downs under the plough which are exposed, both from their height, and from the want of thick enclosures. The whiteness of the flour of wheat, both in London and in the neighbourhood, is a point of such importance, that red wheats will never be cultivated in this county, even on inferior soils, to the extent they are in other parts of England. The kinds most generally sown are the following, arranged according to their comparative goodness:

1. *Brown Danizic.*—This sort of wheat is not apt to lodge; the grain is small and round; the ears are not quite so closely set as those of the thickset kind; the

quality is remarkably good. The weight of the bushel, if the sample be good, is 62 lb. On good land, four quarters and a half are frequently grown.

2. *Thickset.*—The ear of this kind is very large, and, as the name imports, very closely set: the straw is long, very stiff, and generally supports itself so well, that the crop is seldom lodged. The grain is apt to be coarse, and the bran is thick. Five quarters per acre are not unfrequently reaped of this kind of wheat. It is peculiarly well adapted for good land which happens not to be in good condition: in such a case, a better crop may reasonably be expected of this, than of any other sort of wheat. The weight of the thickset is below that of most other kinds, as it seldom exceeds 59 or 60 lb. per bushel.

3. *Old Lammas Brown.*—This sort is seldom sown in Surrey now, though formerly it was cultivated to a considerable extent. It is never sown on good soils, but principally on the thin clay soils on the chalk-hills. The ear is long, the chests far apart, and the grains long. The quality is better than that of the thickset, but it is much more apt to lodge. From four to four quarters and a half per acre, are regarded as a very good crop. The weight per bushel runs from 60 to 61 lb.

The cone or bearded wheat is sometimes sown, but very seldom. There are two kinds of it—the white and the brown. Very great crops are often got; but the quality of the grain is so very inferior, that it is hardly saleable.

VI. *Seed.*—In noticing the different kinds of wheat generally grown in Surrey, the quantity of seed per acre has been stated; but as that referred to good soils,

in

Google

in excellent condition, sown at the most favourable season, it may be proper to add, that the quantity of seed varies from one bushel and a half, which is sufficient where the white Dantzic is sown on the best land, to three bushels and a half, which is the quantity allowed on cold soils, especially in some parts of the Weald. If the wheat is put in pretty early, and the soil is naturally good, and in proper order, from two bushels to two bushels and a half is the usual allowance of seed: the quantity, therefore, varies according to the nature and condition of the ground, and according to the time of sowing. If the soil be naturally good, that is, not only of good quality, but dry and kindly, and if the wheat is sown before the middle of November, less seed is required than if the soil be cold, or the ground foul or poor, or the time be delayed till the month of December. Where the time of sowing alone makes the difference, the quantity runs from two bushels to three bushels: where the soil varies, there is nearly the same difference of seed: where both time and soil are to be taken into the account, the difference must be rather greater. The white Dantzic, as has been already noticed, requires less seed, from the smallness of its grain, than the other kinds.

VII. *Steeping*.—This operation is very generally performed in Surrey: the most usual method is to make a pretty strong brine, in which the grain is suffered to stand over the night, or longer; and upon the grain, after being thus steeped, is sifted some quick-lime, or quick-lime mixed up with water is put on it. The light grains that swim on the top of the brine, are skimmed off. Other farmers make use simply of pure water; in this the wheat is repeatedly and carefully

Digitized by Google

washed, so that all the grains may have been exposed to the water, and be cleared of any impurity that adheres to them. Besides these precautions, the Surrey farmers frequently change their seed-wheat, and are very particular in dressing it well: yet after all, either from these precautions not being so general as they ought to be, from their being taken in a careless and slovenly manner, or from some other cause, wheat infected with the smut is by no means uncommon in Surrey.

VIII. *Water-furrowing.*—On the clay soils, and such other soils as lie on a retentive base, water-furrowing is generally practised with more or less attention and judgment. On the clay soils of the Weald, it is particularly requisite, on account both of the nature of the clay, the low-lying of the fields, and the general flatness of the surface. While, however, the Surrey farmers, who possess clay soils, cannot in general, be charged with neglecting the important operation of water-furrowing their wheat lands, this operation is too often rendered unavailing, or of little utility, by the ditches not being sufficiently deepened and cleared, to carry off the water brought into them by the furrows. The price given for water-furrowing, varies from one halfpenny to one penny per rod, according to the nature of the soil, and other circumstances.

IX. *Hoeing.*—This is never, I believe, bestowed on a broad-cast crop of wheat. In those parts of Surrey where the wheat is drilled, hand-hoeing is generally, but not always given. A horse-hoe, which takes in two drills at once, is used by a few farmers.

The other management of a wheat crop, is to cut or pull up the thistles and other weeds in the spring: and at the same time of the year, to harrow and roll the crop, if the ground is battered and bound with the winter rains.

X. *Reaping and Harvesting.*—The wheat harvest generally commences in the drier and earlier parts of Surrey, on the sandy and calcareous loams, within the first ten days of August: in the Weald, and on the higher lying grounds, the harvest is a few days later. The rich sandy loams about Godalming, are considered the earliest in their wheat harvest of any parts of the county: the latest are such parts of the chalk-hills as consist of a cold thin clay, and at the same time lie in an exposed situation.

The practice of *bagging* wheat instead of cutting it with the sickle or hook, is gaining ground in Surrey. By this operation, the corn is cut much nearer to the ground, and of course there is both more straw and more grain preserved: but bagging is very apt to pull the wheat up by the roots; and as it requires the workman to stoop lower, it is rather more severe work than reaping with a hook. In *bagging*, the workman places one hand near the bottom of the corn, and with the other, strikes against it, as near the ground as possible, with a large hook without any teeth. The wheat is set up in shocks of ten sheafs. There is little or no difference of expense between bagging and reaping with a common sickle. The common price, at the distance of twelve or fourteen miles from London, is about 15*s.* but in some seasons, and for some crops, a guinea per acre has been given.

The weather in Surrey, during harvest time, is generally so regularly warm, that the wheat is often ready to be led into the barn or rick-yard, within four or five days after it is cut: it seldom requires to stand in the field more than eight or ten days.

XI. *Produce.*—In enumerating the different kinds of wheat grown in this county, the produce of each per acre, in favourable seasons, and in very good years, was mentioned. This, perhaps, will give a better idea of the produce of wheat on such lands, than by endeavouring to strike an average. The smallest crops of wheat I heard of did not exceed four sacks, or two quarters: and on the other hand, when a particular field or district was meant to be recommended as peculiarly qualified for wheat, the usual expression was, that it generally produced a load, or five quarters of wheat. On the rich, deep, friable, calcareous loams, near the northern extremity of the chalk-hills, between Croydon and Epsom, six quarters have been grown not unfrequently. On the rich sandy loams near Godalming, a load or five quarters is no uncommon crop: but on the other hand, on the colder soils, the crop seldom exceeds five or six sacks, or two and a half or three quarters. In the Weald, this may fairly be deemed the common crop, except on the drier and richer spots, which not unfrequently produce a load per acre. On the "black-land" the crops of wheat are sometimes very great: but it seems the general opinion in Surrey, that the calcareous, and even the sandy loams, if they be deep and rich, produce not only greater quantities of wheat per acre, than the best clay soils, but also grain of a superior quality. If this opinion be correct, there can be little doubt that it arises partly at least, from the clay soils being unfairly treated, by their not receiving their due proportion of labour, or of manure.

The proportion of straw to wheat, is, in common years, nine truss of the former, each truss weighing 36 lbs. to a sack, or four bushels of the latter.

XII. *Distempers.*—These may be divided into such as occur more or less every year, and such as only make their appearance occasionally. Of the former, the smut, and the disease called the cockle-ear, are the most common; and of these two, the smut is the most prejudicial and extensive. Of occasional diseases, the blight and mildew are most frequent.

It has already been remarked, under the article *Steeping*, that the smut prevails more or less in all parts of Surrey. Respecting this disease, some experiments were made, which proved that it is infectious; and that the infection may be removed. Wheat perfectly free from smut, was rubbed with some smutty balls; the result was, that the wheat previously sound, became diseased, and when sown, produced ears full of smut: part of the sound wheat which had been well rubbed with the balls of smut, was washed repeatedly in clean water: as soon as the water became the least tinged, it was replaced by pure water. This wheat, thus washed after it had been infected by the balls of smut, was sown along with that which had been infected, but *not washed;* and while the produce of the latter proved completely smutty, the produce of the former was entirely free from the disease.

. This experiment completely proves that the communication of the disease, from smut-balls to sound wheat, may be prevented; or if the infection has been already given, that it may be removed by washing the grain in pure water. But as it is evident, that the disease must originally arise from some cause, and cannot in every instance be the result of infection, it becomes of consequence to ascertain, whether pure water will not only wash infected grain clean, and make it perfectly sound, but whether it will also prevent wheat, perfectly free from any adherence of smut, from becoming exposed to that disease. From the success which has attended the use of pure water, instead of brine, it is hardly fair to infer, that the latter operates merely as the former does, *i. e.* to wash off the particles of smut; or that water will as certainly prevent smut as brine has been found to do. All that can fairly be inferred is, that any particles of smut amongst seed-corn, may be prevented from communicating the disease, as effectually by pure water as by brine; but it by no means follows, that because water will prevent the *communication* of the disease, it will therefore prevent the *existence* of it. It *may*, indeed, be the case, that brine is useful only to the same degree as water, in removing the cause of infection; but as the experience of its good effects is so general, and has been witnessed so long, and in such a variety of circumstances, it seems but fair to conclude, that in some cases, where it has been tried successfully, not only no infection existed, but that the actual cause of the disease, whatever it be, was prevented from operating. Till pure water has been tried for a greater length of time, it can hardly be safe to rely upon it for any other purpose but that of preventing the communication of smut.

The mildew considered as affecting the ears of the wheat, and the blight considered as affecting the straw more effectually, are by no means unfrequent in Surrey. In

Digitized by Google

In the year 1804, this county, like all the rest of England, suffered by the blight of its wheat: this of course directed the attention of several of its farmers to the consideration of the probable origin and cause of this disease: the parasitical fungus, to which Sir Joseph Banks attributes the mildew and blight, has been remarked by a very intelligent and attentive observer of Nature, Mr. William Hall, of Ewel, on the wheat in almost every year, in a greater or less degree: and he is of opinion, that if the blight is at all to be ascribed to this fungus, it can be only in years unfavourable to the wheat, when the strength of it is diminished, and when, of course, it is not so well able to resist the attacks of the attached plant. It will probably be found, that this, like all the other disorders of plants, results principally and originally from the state of the atmosphere, or the poorness or peculiar nature of the soil. It seems certain, that some kinds of wheat are more liable to blight than other kinds: and it is rather singular, that in 1804, the blight was less extensive and less fatal, in proportion as we advanced to the North. In Durham and Northumberland it was very partial, appearing only in small strips; and on the other side of the Tweed, it was almost entirely unknown.

Among the weeds which the Surrey farmers, especially those on the borders of the Weald, complain of most, as difficult to be eradicated from their wheat land, and as defying all their efforts to get the seeds of them quite cleared out of their grain, are the "black-bent" and "hedge-hog:" the latter is so called from the extreme resemblance of its seed to the animal of that name.

XIII. *Stacking.*—Most of the wheat is led directly into barns; when it is put up in stacks, the common size of them is from fifty to sixty quarters, if the rick-yard stand well for the wind. The stacks of this and of other grain, are seldom thatched by any of the farmers' servants: there are regular thatchers who go about the country in time of harvest, for that purpose. In a county where the greatest and most valuable part of the grain is put into barns, and where that which is out in the rick-yard, is not exposed to an uncertain climate, it may be of little moment, whether the farmer has to wait his turn of the thatchers, or whether his own servants can cover his stacks; but in a less steady climate, where most of the grain is left in the open air, it is of great importance for the farmer to have the immediate and complete command of persons qualified to put his corn out of danger as speedily as possible.

XIV. *Thrashing.*—Except in a very few instances, this is done by the flail: the price varies according to the state in which the wheat has been got in—from 4*s.* to 5*s.* per quarter is usually given, and 1*s.* per load for binding the straw. The flail in use in Surrey, and the other southern counties, is much lighter than that employed in the North of England—a plain proof that the corn is in general got in, in much better condition in the South than in the North.

XV. *Stubbles.*—Where the wheat is not *bagged*, it is cut very high: even in the neighbourhood of London, where there is such an excellent market for straw, it is no uncommon thing to see stubbles 18 inches long. These stubbles are suffered to stand till the latter end of November, when they are mown close to the ground, raked together, and carried into the farmer's yard for litter. Boys are generally employed to rake the stubbles, at *6d.* per acre.

## SECT. V.—RYE.

This grain is seldom sown in Surrey, except for spring-feed for sheep, or for seed. It commonly is put into ground intended for turnips, or summer-fallow, about the end of August, or beginning of September. The quantity of seed is about three bushels: when it is suffered to stand, it ripens about the 12th or 14th of July: the produce runs from three quarters to four quarters and a half per acre: the weight of the bushel is from 56 to 60 lb. The straw, which is principally bought by the brick-makers, fetches from *50s.* to *3l.* per load. As green food, it comes in before the winter-tares. Before it begins to shoot up, it is very acceptable and nourishing to sheep; but they dislike it afterwards.

## SECT. VI.—BARLEY.

As it is a very common opinion in Surrey, that barley will not thrive well on clay soils, and as these soils, if they were to be prepared for barley, would require a great deal of time and labour to bring them into proper tilth, the quantity of this grain sown in this county is not very considerable. It is almost entirely excluded from the Weald, and from the stronger soils in the other parts of the county: even soils that are sown with turnips, if they be of a strong nature, are seldom prepared for barley after the turnip crop is eaten off; so that this grain may be considered as confined to the lighter and drier turnip soils—to the calcareous and sandy loams. I heard of one instance, in which, this year (1807), it had been sown on the "black-land," below Mestham. The crop was remarkable, producing, *it was said*, three loads per acre: the straw very long, and so firm and strong, as not to be the least lodged, even though the crop was so very abundant. But as the sowing of barley upon clay soils is a very uncommon practice, we may fairly regard the light and dry loams as the barley soil of this county. On them, barley generally follows turnips—sometimes pease, and in a few instances, wheat. As the object of the preparation of the soil, viz. the reducing it to a very fine tilth, is the same, whatever be the preceding crop, we shall state it generally, without reference to the rotation.

1. *Tillage*.—This consists of a ploughing, pretty deep, after the turnips are eaten off: the ground is then rolled and harrowed, and, in most cases, the second ploughing is shallow, being intended for the seed-furrow: when it is thought necessary to plough thrice, the second ploughing is given across the direction of the first. Some farmers, instead of the plough, make use of the scuffler, or nine-share, for the seed-furrow, which they find to answer equally well, while it performs the work in much less time.

2. *Drilling*.—In the very extensive tract of barley soil about Esher, Ockham, Cobham, Send, &c. drilling is very general; but in the other parts of the

county, it is little practised. The drills are about ten or twelve inches apart; and the seed is put in by a machine, which is drawn by one horse, and sows two drills at a time. Hand-hoeing is more common than horse-hoeing; but too often, neither are given to the crop.

3. *Time.*—The practice of sowing this grain much earlier than was formerly customary, is gaining ground. In the climate of Surrey, where the warm weather sets in very early, it is of great importance to get the barley into the ground, while there is sufficient moisture to make it spring equally and well, and when there is a prospect that it will attain a good height before the dry weather sets in. The two great things to be guarded against in a crop of barley are, its coming up thin and straggling, and its being deficient in straw: these are most effectually prevented by early sowing. Formerly it was the custom, to sow most of the barley in May; now it is often sown in the beginning of April, or towards the end of March.

4. *Sort.*—The barley sown in Surrey is generally procured from Norfolk, or the Isle of Thanet. The grain is plump and short—thick in the middle, and going off at each end with a sudden curve: the colour is pale and clear; the skin is thin, and not husky; the straw is rather short and tapering.

5. *Seed.*—The quantity of seed usually allowed, viz. a sack per acre, appears great, when it is considered that this grain has always the advantage of being sown on light dry soils, and generally of succeeding a turnip crop eaten off. It is probable, that if it be sown on

land in good condition, in the month of April, two bushels and a half, or three bushels, would be amply sufficient. Barley *tillers* or spreads more than any other grain, so that it appears to require less seed than either wheat or oats; and in many parts of the kingdom, even where it is sown on strong clay soils, much less seed is found sufficient than is given in Surrey.

6. *Rolling*.—The ground is rolled after the barley is sown; and as grass-seeds are usually sown on the same land soon afterwards, the barley has the advantage of another rolling, as well as of a slight harrowing.

7. *Harvesting*.—The barley harvest usually commences during the last ten days of August. The crop is suffered to stand till the grain is completely ripe, and the straw deprived of all its moisture. It is then cut with a scythe, with or without a cradle on it: after it is cut, it lies untouched till the morning of the day on which it is intended to lead it, which is generally done in the course of four or five days: instances have occurred, in which it has been led the very day it was cut. It is raked into rows or heaps, just before it is led, and forked into the waggon loose. It is more commonly put into stacks than wheat: these are sometimes round, but more generally formed like a common hay-stack. There are a few permanent sheds, open on every side, under which the barley is put in some parts of the county.

The practice of harvesting barley in this manner is so very common, and has been so long established in Surrey, that it would probably be difficult to introduce the binding it into sheafs; and indeed the straw is often so very short, that this could not be done without

out much trouble and expense. On the other hand, the present practice sheds the barley very much: whoever walks over the barley-stubble a month or six weeks after harvest, must have observed nearly the seed of the barley springing up. The expense of harvesting the barley in the usual mode, is a great recommendation, where labour is so dear, as it seldom exceeds 4*s*. or 5*s*. per acre, and often does not reach 3*s*. This, with the difficulty of procuring hands to bind up the crop, will go a great way to continue the present practice.

8. *Produce.*—On the best barley soils, after a good crop of turnips, from six, to seven quarters and a half are no uncommon produce. As barley is not often grown but on land in good condition, and generally after turnips, the produce, even on inferior soils, may be reckoned at seven or eight sacks. The proportion of straw to corn varies more in this crop than in any other, with the exception perhaps of pease. In a favourable season, a load of straw is expected for four sacks of grain. The straw is either consumed in the straw-yard, or sold for packing.

9. *Awns.*—These are very difficult to be got clear off, either by the flail or the thrashing-machine. An instrument is used for that purpose, which, in some degree, answers. It is a square box made of iron, about nine or ten inches each way: a wooden handle is fixed on the upper part: the lower part is open. Iron spikes are fastened in the inside of the box, which, by being forcibly driven down upon the barley, in some degree remove the awns.

10. *Malt.*—The barley that is grown between Kingston and Guildford, is deemed not inferior to any in the kingdom for the purpose of malting: formerly it was used almost entirely in the extensive maltings in this county at Battersea, Kingston, Guildford, Nine-Elms, Croydon, Mortlake, &c.; but within these few years, the barley from Norfolk, being afforded at a lower price, has carried off the market for the Surrey barley in some degree, and, of course, rendered this crop not so valuable as it was formerly. As, however, the barley in the district just mentioned is of remarkably good quality, it still is in great demand among the London brewers. No other use is made of the barley of this county, but that of malting.

## SECT. VII.—OATS.

THIS grain does not form a regular part of the rotation on any, except the strong soils, and especially on the clays of the Weald: there it generally comes in after clover: on the northern clays, the clover is now more commonly followed by beans, or wheat, than by oats. When oats are sown on the lighter soils, it is commonly after wheat. On the strong loams, a crop of oats is preferred to barley, after turnips.

From the general inferiority of the oats which grow in the South of England, to those which grow in the North, it seems probable that this grain is better suited to a cold, than to a very warm, climate. The circumstance, indeed, of their being too often sown on exhausted and foul ground, after a white crop, in the South of England, while in the North they have the advan-

Digitized by Google

advantage of a clean clover-ley, may in some degree account for the difference of quality; but the difference is too uniform, to be attributed solely to this cause. Even when oats have been sown in the most favourable circumstances, the grain is not found of superior quality: it is long-tailed, flat, and husky, evidently containing a small proportion of meal. Some of the Surrey farmers told me, they had often procured seed-oats from Scotland, and the North of England; but that in a year or two they degenerated. It seems therefore reasonable to infer, that oats are a grain better adapted for northern than for southern climates.

I. *Tillage.*—This depends upon the preceding crop. In the regular rotation, *i. e.* where oats follow clover-ley, turnips, or pease, one ploughing is deemed sufficient: this is given, after clover, in January or February; after turnips, as soon as the field is cleared; and after pease or beans, towards the end of February. When oats are sown after wheat, two ploughings are usually given—one deep, before winter; the other shallow, towards the end of February.

Oats are drilled in the same district of Surrey where wheat and barley are drilled, viz. about Esher, Ockham, Send, &c.; though some farmers, who practise drilling with respect to the two latter crops, do not think it answers so well with oats; and, indeed, as this grain throws out very few shoots, it would seem to require to be sown very thick.

On the new enclosures near Send, I heard of a successful instance of oats having been put in without ploughing. The ground, like all ground newly broken up, was *duffey*, or spongy: the soil was naturally light: a crop of turnips had been eaten off by sheep, by which the ground had been rendered more firm. The oats were then drilled in, and the crop proved a very good one.

II. *Time.*—Oats are sown on the clover-leys towards the end of February, or as soon afterwards as the ground is sufficiently dry: when they follow turnips or wheat, they are not sown till March or April.

III. *Sort.*—There are several sorts of oats grown in Surrey, viz.:

1. *The Potatoe Oat.*—This has been cultivated only about three or four years. It is usually sown on strong land, after turnips; a sack, or four bushels, is the allowance of seed per acre. The produce runs from six to seven quarters and a half.

2. *The Friesland*, or *Dutch Brue Oat.*

3. *The Poland Oat.*

4. *The Tartarian Oat.*—This kind produces most straw, and often very great crops; but the quality of the grain is very bad. It is seldom sown after turnips.

5. *The Scotch.*—This appears to be what, in Scotland, is called the Angus oat: it is much esteemed in Surrey.

6. *The Siberian.*

7. *The Black Oat.*—This is much grown, and is regarded as well calculated for feeding horses.

8. *The Red Oat.*—This kind is sown after turnips.

IV. *Seed.*—The most common quantity is four bushels per acre: on rich soils, three bushels and a half are sometimes sown; and on the other hand, five bushels are allowed when the ground is not in good condition, or the sowing is delayed till April.

V. *Harvesting.*—Oats are generally mown, except when the crop is very heavy, when they are reaped, and put up in sheaves. The potatoe, and the other early kinds, are ready before the regular harvest: the later kinds about the same time as the wheat. The price of reaping is from 10*s*. to 15*s*. per acre; of mowing, from 2*s*. to 4*s*.

VI. *Produce.*—As oats are often sown on foul land, after a crop of wheat or barley, the produce is sometimes very low—not exceeding three quarters. When they are sown on clean ley, or after turnips, from six to eight quarters are often reaped.

VII. *Straw.*—The proportion of straw to corn varies with the kind of oats: the potatoe and red oat yield little straw; the Friesland, Tartarian, and Poland oat, much more: in a favourable season, a load of straw may be expected for every quarter and a half of grain. The straw of oats is principally given to the horses, or to oxen in the straw-yard, during winter.

VIII. *Application.*—By far the greatest part of the oats are given to the work horses: there are not many farmers in Surrey, who grow so many as to be able to dispose of any great quantity.

A few oats are also given to sheep while they are on turnips, and to oxen while they are fattening.

IX. *Price.*—It is observable, that the price of oats bears a smaller proportion to that of wheat in England, than it does in Scotland. The price of oats in Surrey, like the price of all other grain, is regulated by the price in the London market. Croydon is a principal market for them.

## SECT. VIII.—PEASE.

These may be divided into the white pease, grown by the gardeners, and farming gardeners; and the grey pease: the former are cultivated in the more immediate neighbourhood of London, and on the sandy loams near the Thames, about Mortlake; the latter are very extensively grown in most of the other parts of the county, particularly on the Chalk-hills, where, from the flinty and shallow nature of the soil, beans are not found to thrive so well. Few, if any, pease are grown in the Weald. Referring to Mr. Middleton's Survey of Middlesex for a full account of the culture, management, &c. of the garden pease, we shall confine our remarks to those which are cultivated by the farmer. At a distance from the London market, the farmer seldom ventures to sow white pease, unless his soil be very early, dry, and rich; as it is found that they will not *break* or split easily, if grown on a soil inclining to be strong or moist.

Pease generally follow wheat, clover, or oats: if they succeed wheat, they are regarded as an additional crop to the regular rotation of turnips, barley, clover, wheat, on light land; or on strong soils, they come in between two crops of wheat. They are also grown after barley, when the clover happens to fail.

1. *Tillage*.—When a crop of wheat has preceded, the stubble is either whole or rafter ploughed in October or November; and after being harrowed down in spring, it is again ploughed: after clover-ley, one furrow is given.

2. *Drilling.*—Pease are generally drilled about Guildford—in other parts of the county, they are mostly sown broad-cast. Dibbling used formerly to be practised, but it has given way to the practice of drilling. Where they are sown broad-cast, it is considered the better way to plough them in with a shallow furrow, and afterwards to harrow the ground lightly.

3. *Time.*—The end of February, on the low lying and dry soils, and the middle or end of March on the wetter and more exposed grounds, are the usual seasons of sowing.

4. *Sort.*—The Marlborough grey, and the partridge pea, are the most common sorts. It is remarked, that the first sort, if the seed be procured directly from Marlborough, are earlier by ten or fourteen days than if the seed be got in Surrey: the partridge or mottled pea is not so early as the Marlborough. There is another kind of pea, which ripens along with the beans, and which therefore is often sown with them: when they are sown together, they are called "polts."

5. *Seed.*—When pease are sown broad-cast, a sack, or four bushels per acre, is the usual allowance of seed: if they are drilled at the distance of twelve or fifteen inches, from two bushels to two bushels and a half are allowed.

6. *Hoeing.*—The drilled pease are mostly hoed by hand: the expense per acre is about 6*s*. or 7*s*.

7. *Harvesting.*—Most of the pease grown in Surrey are ripe before the usual harvest of the white corn—generally

Digitized by Google

nerally about the end of July. They are universally cut with hooks, tied up in large bunches with part of the haulm, and after being sufficiently dried, by being turned over, they are led and made into large oblong stacks, roofed like hay-stacks.

8. *Produce.*—Pease are almost proverbially a precarious and variable crop in every part of the kingdom In wet seasons there is plenty of straw, but little grain: in very dry years, the straw turns yellow at the root, and dies away before the pods are filled. The crop fails in Surrey much more frequently in the latter, than in the former way. This year (1807) it failed very generally so completely, that the seed was hardly got from the crop.

In favourable seasons, the crop will run from three to five quarters. It is observable, that calcareous soils are more favourable to the growth of this crop, than soils which have no chalk or lime in their composition. On some of the calcareous ground, even where it lay high and exposed, I was informed that from ten to twelve sacks (five to six quarters) were frequently got.

9. *Thrashing.*—This is done entirely by the flail: the price varies from 2*s.* 6*d.* to 3*s.* 6*d.* per quarter.

10. *Straw.*—This is entirely used as food for the farm-horses.

11. *Application.*—It does not seem an easy matter to ascertain the uses to which the grey pease are applied: the quantity used for the fattening of hogs, though considerable, would scarcely take off the crop of an average year; and yet the principal demand seems for this purpose.

SECT.

### SECT. IX.—BEANS.

GARDEN-BEANS are grown in considerable quantities near London, and on the banks of the Thames about Mortlake, Walton, &c. In other parts of the county, on the strong soils, the different varieties of the field-bean are grown, but neither in such quantities, nor in such a manner, as they ought to be. Indeed, it may be justly observed, that the bean-stubbles are generally much fouler than any other stubble, wherever, as is too often the case, the beans have been sown broad-cast.

1. *Tillage.*—Beans generally follow wheat or clover-ley: the preparation is nearly the same as for pease, *i. e.* two ploughings after wheat, and one after clover.

2. *Manuring.*—If it is intended to sow wheat after the beans, the ground is manured: otherwise, not. The manure is commonly laid on before the first ploughing.

3. *Drilling.*—This is not practised. It is said that the soils on which the beans usually sown, would not bear the drill so early as they ought to be put in. Where, therefore, they are not sown broad-cast, they are dibbled.

4. *Dibbling.*—This is performed by means of a line, sometimes set lengthways and sometimes across the ridge: the common distance of the lines is from fifteen

to twenty inches: of the beans from each other, between four and five inches. The expense is from 7*s.* to 10*s.* per acre.

5. *Time.*—Some beans are sown in January; but the greater part about the beginning of February. The objection to early sowing is, that beans are very easily killed by the frost: the advantage is, that they are not so apt to be injured by insects, and are got off the grounds earlier.

6. *Sort.*—The field-beans generally grown, are, 1st, The purple American: this has been introduced but lately: it is a small bean, but the quality is very good. 2d, The small horse-bean. 3d, The tick bean; and 4th, The Mazagan bean.

7. *Seed.*—Where beans are sown, from three to four bushels and a half are allowed per acre: if they are dibbled, two, or two bushels and a half are quite sufficient.

8. *Depth.*—They are commonly deposited three or four inches below the surface, whether they are dibbled or sown; as in the latter case, the preferable mode is to plough them under, the ground is harrowed a few days after the beans are put in, and sometimes rolled.

9. *Hand-hoeing.*—The drilled and dibbled beans are hoed once, and sometimes twice, with the hand-hoe: the first time, when they are four or five inches high, and the second time, as late as can be done without in-

juring them. The expense of the first hoeing is 8*s*. per acre, for the second 6*s*. The horse-hoe is not used.

10. *Distempers*.—The black aphis, probably the same which frequently makes such ravages in the hop-grounds, sometimes covers the bean crop completely, and renders it of little value. Though the occurrence of this insect in such numbers as to be prejudicial, most probably depends upon a particular state of the atmosphere, or the nature of the weather, yet nothing clear or decisive is known.

11. *Harvesting*.—As the bean crop in Surrey is permitted to stand till they are thoroughly ripe, it is seldom cut down before the end of August, or the beginning of September. They are commonly bagged close to the ground: sometimes they are mown: the practice of binding them up with rope-yarn is becoming common: where this is not used, straw ropes are employed: the sheaves, which are made small, are set up in shocks of four or six; some set them up in a circle, and pile other sheaves with the bottom spread out upon the lower tier.

12. *Produce*.—This is very various: where they are sown broad-cast, on foul land, and not hoed, the produce is often not more than ten or twelve bushels: or, if the weather prove very dry, and the beans are attacked with the fly, the produce will not exceed sixteen or twenty bushels, even on good land, well manured. In a favourable season, on good land, where the beans are drilled or dibbled, and carefully hoed, the produce runs from three and a half to five quarters and a half.

13. *Straw.*—The straw is seldom used for any purpose but as litter; occasionally it is given as food to the horses.

14. *Application.*—By the farmer they are given whole or bruised, to his horses: to sheep, while they are at turnips; and sometimes to hogs. It is said that large quantities are sent to the West Indies for the food of the negroes.

The extension of the growth of beans, and a more general attention to the careful and proper culture of them, would be of great benefit to the agriculture of Surrey. At present, they are very little cultivated in the Weald, though on most parts of that district they would be a valuable crop: even on the richer and deeper clays in the other parts of the county, their culture is by no means so general as it ought to be. The mode of sowing them broad-cast on foul land, cannot be too severely reprobated: they ought in every instance to be planted in rows, and upon land that is free from root-weeds. Great advantage would arise from planting them at greater intervals: the rows ought to be so wide as freely to admit a single horse-plough, *i. e.* they should never be nearer to each other than twenty-four or twenty-seven inches. Where they can be dibbled in at the expense of 8*s.* or 10*s.* per acre, and half the seed saved, this method is preferable to drilling them, or planting them after every third plough, as is usual in some parts: beside a saving of seed greater than the additional expense of labour, they can, by being dibbled, be put into the ground much earlier than if they were drilled or planted after the plough. By making the rows at a greater distance, and using a small plough or horse-hoe in addition to the hand-hoeing,

ing, not only would the crop be benefited, but the land would always be left in a fit state for wheat, as a preparation for which, in a county where barley is never sown on a strong or bean soil, they should regularly be cultivated.

### SECT. X.—TARES.

Very few spring tares are sown: the winter tares generally follow oats or wheat, sometimes pease. On strong land, they come in on the fallow-break: on light land, on the break which is intended for turnips. The culture of winter tares is extending: very few are sown for seed: by far the greatest number either for sheep-feed, or to be cut green and given to the work-horses.

1. *Tillage.*—The ground is seldom ploughed oftener than once: if the summer has proved extremely dry, it is advisable to break it up by a previous deep furrow; and after rain to give it a shallow ploughing. By some farmers they are sown under furrow, especially if the soil be light: by others, they are sown upon the furrow, and harrowed in: the former is the preferable mode, as it secures them from being thrown out of the ground by the frost.

2. *Seed.*—From two to three bushels are sown: as they are seldom intended for seed, it is better to sow them thick: rye is sometimes sown with them, but wheat is better suited to their period of growing, and accordingly is mixed with them by some farmers,

in the proportion of two-thirds tares and one-third wheat.

3. *Time.*—Winter tares are sown in September, October, and November, in such portions, and at such distances of time, as the farmer thinks will secure regular food for his stock. Spring tares are sown in February and March.

4. *Application.*—On sheep farms, they are folded off by the flock, in the month of May, after the Swedish turnips and rye are consumed. Part of the crop is usually mown and carried off the field: the hurdles are fixed on the cleared part, on which tares mown from the adjoining part of the field are thrown. A crop of good tares will, if properly managed, afford plenty of nourishing food for sheep, at a time of the year when sheep-feed is particularly scarce: it is calculated, that an acre will keep 200 or 220 sheep a week: at this rate, they are about double the value of turnips for the same purpose. If the more economical practice of Wiltshire, viz. that of mowing the tares and putting them into racks or cages, were generally adopted, the value of the crop for feeding sheep would be much increased. Mr. Pennington, of Lee Place, mows his tares, carts them into his farm-yard, and there feeds his sheep on them: this method seems preferable to that of folding the sheep on the ground, when the tares are not put into racks, but perhaps, on the whole, not equal to the Wiltshire method. In some parts of the Surrey hills, the sheep are turned loose on the tares, and after having gone once over them, are again put on them.

Where no sheep are kept, the tares are cut green and given to the work-horses or milch-cows. Their value for this purpose is even greater than when they are fed off by sheep: for though there is the additional expense of carting them home, yet the great quantity of manure which they produce, if sufficient litter is allowed, much more than pays for this additional trouble; and it is found that horses will undergo much more work on tares than on clover, while at the same time, an acre of the former will go a great deal farther than an acre of the latter.

5. *Harvesting.*—When they are intended for seed, they are mown or cut with a hook, and after the wads have been turned two or three times, they are carted and stacked.

6. *Produce.*—This varies very much, even more than the produce of pease: from twenty to twenty-four bushels are a good crop: in very favourable seasons, five quarters have been got; and in other seasons scarcely the seed. Tares are seldom or never made into hay.

## SECT. XI.—LENTILS.

A SPECIES of lentil, provincially called "dill," was cultivated to a small extent last year, by Mr. Pennington, of Lee Place, near Godstone: as far as he could judge by a single trial, he was inclined to think rather favourably of the "dill." He had made it into hay; and although from its having got rain, the straw was much discoloured and rather spoilt, the pods were numerous and well filled. Mr. Salisbury, of the Botanic-garden, Brompton, however, informs me, that it is by no means a profitable crop; as it seldom produces either much straw or corn. If, however, as is said, sheep are very fond of the hay, it deserves to be cultivated on this account, as it is very difficult, though sometimes very desirable and necessary, to get them to eat dry food.

## SECT. XII.—BUCK-WHEAT.

VERY little of this is grown in the county. I observed a few fields between Croydon and Godstone, on the sides of the calcareous hills: a small field between Cobham and Esher on a sandy soil; and I was informed by Mr. Bradford, of Effingham-hall, that he generally sowed his sainfoin along with it, and considered it as well calculated for sowing with grass seeds, as not being so liable to smother the young and tender plants, as barley or wheat.

1. *Soil.*—The soil best suited for buck-wheat, is a dry, sandy, or calcareous loam: but on the hills between Croydon and Godstone, where I saw it growing, the soil, though kept dry by the steepness of the surface, was a tough, pale, clayey loam.

2. *Preparation, &c.*—The ground is seldom ploughed till the spring, it then receives three ploughings; the last shallow, and the seed is sown towards the end of May, on the furrow, at the rate of three pecks, if drilled, and one bushel and a half broad-cast. As the

young plants are easily destroyed by the least frost, it is not safe to sow till there is no danger of frosty mornings.

3. *Harvesting.*—This crop is late, seldom being ripe till the middle, or end of September: even this year (1807), which was very dry and warm, when all other grain was harvested early, the buck-wheat was lying in swath on the sands near Cobham, and only partly cut on the hills between Croydon and Godstone. As, however, this crop, from its not being liable to be injured, or to have the grain shed by wet weather, is often suffered to lie long in the field, it is probable, that that near Cobham had been cut some time.

4. *Produce.*—This is often much greater, than a person unacquainted with buck-wheat, would suppose from its appearance: even when it is thin on the ground, it is very productive: three, four, five, and sometimes six quarters, are reaped.

5. *Application.*—It is given principally to poultry and hogs; both of which are remarkably fond of it, and thrive and fatten well upon it. It is sometimes bruised and given to horses, and it is said, two bushels of it will go as far as three bushels of oats. The hay is given chiefly to cattle in the straw-yard. It is very seldom ploughed in green, or cut in that state for soiling.

## SECT. XIII.—TURNIPS.

It is difficult to ascertain exactly the time when turnips were first cultivated, in the fields, in this county; but there is every reason to suppose that they have been grown here nearly as long as in any other county of England. Sir Richard Weston, of Sutton, in Surrey, in his "Directions for the improvement of Barren Land" (first published in 1645, and afterwards republished by Gabriel Reeve, 1670), gives a very clear and full account of the mode of raising turnips practised in Flanders and Brabant; and strongly recommends the use of them to his countrymen. There is no ground to ascertain positively, whether the culture of them in Surrey, or in any other part of England, was begun and carried to any extent, in consequence of the publication of his book, though it is highly probable, as it was addressed to his sons, that under their direction the culture of turnips would, at least, be attempted. However this may be, the account given by Mr. Kent in his Survey of Norfolk, is certainly incorrect: he says, that the Lord Viscount Townshend, having attended King George I. to Hanover, had there an opportunity of being fully acquainted with the various advantages derived from the general cultivation of that root. On his return to England, he brought some turnip seed along with him, and introduced the turnip husbandry among his tenants and neighbours in Norfolk. We do not know whether the turnip husbandry is *now* established in Hanover, but it certainly was not in the time of George I.; as George II. caused an abstract of the Norfolk system of turnip husbandry, to be drawn up for the use of his subjects in Hanover*. As far back as the memory of one of the oldest labourers in Surrey would enable me to trace, I found that turnips had been cultivated in his neighbourhood (about Cheam and Ewel), nearly to as great an extent, and in his opinion, with at least as much success as they are now.

The culture of them, however, has certainly extended considerably in this county within these fifteen or twenty years: the greater importance and value which, within that period, the farmers in general have attached to their flocks of sheep, have naturally led them to pay particular attention to the culture of every crop, by which they could be more certainly and regularly fed through the winter, or more cheaply and expeditiously fatted for the butcher. Hence, we see turnips grown on lands by no means well calculated for them: to a considerable extent on the strong and rather wet loams in the northern parts of the county, and even in some parts of the clays of the Weald. Of the proper turnip soils, this crop may fairly be considered as occupying a fifth part: if the stubble turnips be taken into the account, considerably more. The proportion of turnips on the heavy loams, and on the thin clays incumbent on chalk, is certainly less; though not very much so, where large breeding flocks are kept.

*Soil*.—The preceding observations, render any particular description of the soils on which turnips are grown in this county, unnecessary. The light and

---

* Campbell's Political Survey of Great Britain, vol. iii. p. 80. Dublin edition, 8vo.

Digitized by Google

open soils are of course preferred: both because they require less preparation, and because the crops on them are more certain and more abundant, and the danger of the ground being poached much less. These soils, too, are considered as being much benefited by the treading of the sheep, when they are folded on them.

*Tillage.*—This depends upon the preceding crop. Sometimes, rye fed off, winter-tares used in the same manner, or stubble turnips, are taken between the last crop of corn and the regular crop of turnips: in such cases, the land of course cannot receive very much work, as by the time the rye, tares, or stubble turnips are off the ground, it is nearly the season to begin sowing the regular crop of turnips. When it is intended not to take any winter crop before the turnips, the stubble is generally ploughed the first time, as soon after the *wheat-seed* as it can be done, and left rough all the winter. Some farmers rafter-plough it the first time. A much preferable method, however, is followed by Mr. Drewitt, of Send, on his dry lands: these he first ploughs completely, and then lays them up, in a direction contrary to that of the first ploughing, in one-bout ridges. He justly objects to rafter-ploughing land, as leaving half the ground untouched by the plough: by the method he adopts, he gives his soil all the advantage of rafter-ploughing, that of exposing a greater surface to the frost and air, while at the same time every part of it is equally stirred by the plough. On all dry land, and even on wet lands that have a sufficient declivity to carry off the surface water, Mr. Drewitt's method seems an excellent one.

Before the second ploughing is given to the turnip lands (which is seldom before the barley is all sown), the drag-harrow is used: the second ploughing is generally across, and to the full depth of eight or nine inches. After the root-weeds have been brought to the surface by repeated harrowings, and burnt, and after the ground has been reduced by the roller, the manure is generally spread: the more careful and intelligent farmers, however, plough four or five times before they put on the manure. Indeed, one of the most common and general faults of the turnip husbandry in Surrey, lies in the ground not being sufficiently pulverized: the failure or deficiency of the crops, in many instances, may be attributed to this cause. This year, the only good crops of turnips were upon the sandy loams, where, of course, the soil was easily reduced to a proper degree of fineness. The fact, that the turnips were better this year on the strong cloddy loams, than on soils of a moderate texture and fineness, may at first sight appear in favour of leaving a rough surface for this plant; but, on reflection, this circumstance will be found not to support the conclusion. The principal object in making turnip land fine, is, that any moisture that falls may easily reach the seeds; since, without moisture, they will not vegetate: but it is well known, that on lands naturally strong and damp, the moisture will be retained longer if the surface is left covered with large clods, than if it is reduced to that degree of fineness of which such soils are capable. To favour the growth of turnips, such soils must either be pulverized by repeated ploughings as much as sandy loams are, or they must be left in large clods. In the former case, they would *take in* any moisture that fell; in the latter, they would retain the moisture natural to them: if they were left merely rough, so as the lighter loams were this year, they would lose their natural

moisture,

moisture, without being sufficiently fine to take in the moisture of the atmosphere. When strong moist land, therefore, is intended for turnips, it is perhaps better, unless the weather is extremely favourable for reducing it *very fine indeed*, to leave it with a good clod upon it; but on loams of a moderate texture, as this clod cannot be got, unless they are ploughed too wet, and as they can be reduced very fine without much labour, it is always advisable to use the plough, harrows, and roller, till they are reduced to the finest powder.

*Manuring.*—If the land has borne a crop of tares, stubble turnips, or rye, the preceding winter, and they have been folded off, it is not very common to manure it again for the regular turnip crop: it is, however, the safest way to give a small dressing. When no winter crop folded off has been grown, the land is always dunged. In some parts, indeed, particularly in the neighbourhood of the Downs, the manure that the folding of sheep on the land meant for turnips, will give, is thought sufficient. With respect to a regular and proper manuring, it used formerly to be the universal practice, and is still very general, to apply to the turnips the whole dung that was meant to be applied during the rotation: the superior advantage, however, of manuring oftener, or of dividing the quantity meant for the rotation into two parts, laid on at different times, is beginning to be perceived; and many farmers who used to apply a certain quantity of manure (twelve loads, for instance) to their turnips, now give that crop only half, and reserve the other half for the clover, or, more properly speaking, the wheat that succeeds the clover.

In whatever manner manure operates, or whatever be the parts of it that support the plants, there can be no doubt that the most useful part of it is constantly exhaling, in a small degree at least, even from ground when under crop, and in a much greater proportion from land while it is ploughing and uncropped: if more is laid upon the ground than the crop can take up, a proportion of that superfluity must be lost; and the greater the quantity above what the crop needs that is applied, the greater will be the loss. If other circumstances were not against the plan, it would therefore be much more beneficial to manure the land every year for each crop, and to proportion the quantity as nearly as possible to the wants of the crop. As this cannot be done, the mode that approaches nearest to it is the best, viz. that of laying on the same quantity of manure at different periods of the rotation, instead of laying it all on, as is too often the case, at once. These observations have been drawn from us, in noticing the practice of some of the best Surrey farmers, with regard to manuring their turnip lands; but they are equally applicable to the manuring of such lands as are under the system of a summer-fallow.

*Time.*—There are very few turnips sown in June, except they are intended for the London market: the greater number are sown in July, rather towards the end of it, and during the month of August: the stubble-turnips, of course, are sown as soon as they can be conveniently got in, after the crop is off the ground. The early sowing of turnips, *i. e.* in the month of June, is allowed by the Surrey farmers to be advantageous in one respect; but they contend, that the disadvantages more than counterbalance the advantages: by sowing them early, they spring up more regularly and

certainly,

certainly, from the greater quantity of moisture then in the ground: if the fly should attack them, there is also sufficient time, if they have been sown in June, to sow them again. On the other hand, when they are sown early, they almost certainly begin to shoot and seed very soon in the winter, and of course become of little or no value. In a climate so mild and favourable to vegetation as that which Surrey enjoys, the aftermaths of the natural and artificial grasses continue to grow, and to be fit for pasture, much longer than in a more northern climate, while, at the same time, the turnips are also more quick in their growth: the Surrey farmers, of course, do not need their turnips so soon as the farmers in more northern counties, while their turnips are much more forward. It may justly be questioned, whether this crop is so well adapted to a dry and forward climate, as to one that is rather moist and backward: it is certain, that in the latter they vegetate much more kindly and certainly, while at the same time they seldom are so backward as not to be ready when the grass fails, and scarcely ever so forward as to be ready while there is a sufficiency of pasture.

As the months of June and July, and the beginning of August, have all been tried in Surrey, and the crops sown in July have generally been found the safest and the best, it is to be presumed that that month is the most proper time for turnip-sowing in this county. But it might be advisable, especially where large flocks are kept, to sow turnips at different periods, between the middle of June and the beginning of August, as the most probable method of having them ready at different seasons

*Drilling.*—There are perhaps not 20 acres of drilled turnips in the whole county: Mr. William Hall, of Ewel, Mr. Trotter, near the same place, and Mr. Page, of Pointers, were the only persons I met with that had drilled turnips. There seemed a prejudice against them, even among the most enlightened farmers. The objections I heard urged against them were, that, although by the drill system, a greater weight of turnips *might* be raised, yet from the greater size, and consequent greater sponginess and looseness of texture, of the drilled turnips, they did not afford so much feed per acre; and that turnips on the drills were much more liable to spoil. In the neighbourhood of Cheam, I believe a prejudice had arisen from another cause. Mr. Logan, from Berwickshire, who had a farm in that parish, drilled some turnips; but the intervals between the drills were so very deep, that the sheep fell into them on their backs, and several of them were thus lost. An objection to them on this score, is evidently an objection to the improper management of the drilling system: it may not be amiss, however, to consider the other objections, before proceeding to an examination of the comparative merits of the broad-cast and drill method of growing turnips.

The remark, that a greater weight of drilled turnips does not afford more food, it is not very easy to understand. Allowing, for the present, that the greater size of drilled turnips renders them more apt to be spongy, yet if, notwithstanding their sponginess, an acre of them weighs more than an acre of broad-cast turnips, it is to be presumed that it also affords more nourishment, unless it can be shewn, that the power of feeding decreases with the sponginess. But it does not necessarily follow, that drilled turnips must be of so very large a size as to become spongy. If it is found that drilling them at certain intervals, and manuring them with a certain quantity of dung, are apt to make them too large, their size may easily be reduced by narrowing the drills, or reducing the quantity of manure. It is much more easy, by the drill husbandry, to keep the size of turnips within the limits most favourable to feeding, than it is by the broad-cast method, to grow the turnips of that size which will afford the greatest nourishment, from a given quantity of land.

The objection, that drill turnips spoil much more easily than broad-cast ones, does not affect the drill system itself, but the improper management of it: by the drill system with respect to turnips, is merely meant the sowing them in rows, in contradistinction to growing them broad-cast. It is by no means necessary to the drilling of turnips, that they should stand on ridges much, or, unless it be thought advantageous, at all raised above the level of the field. It is an easy matter to raise the drills merely to that height, which will secure all the advantages that can be derived from this mode, without exposing the turnips to be at all more injured by the frost than if they had been sown broad-cast. But, if we reflect what kind of weather it is that most commonly rots turnips, we shall find that, by being raised above the level of the field, they are much less exposed to it than if they grew on the flat surface. There are not nearly so many turnips destroyed by a dry frost, as by rain and frost alternately: the turnips are first drenched with the rain, and the frost succeeding, acts on them with much more effect than if they were dry. Now, by being placed on a raised drill, they are secured in a great measure from the rain; and though they are thus more exposed to the frost, yet on the whole, they will derive more benefit by being secured from the former, than they will suffer injury from being exposed to the latter, when it is not preceded by their being drenched with rain.

In comparing the relative advantages of raising any crop by two different methods, the objects to be inquired into are, by which method can a crop equally good be raised with the least labour? by which method will the same labour raise a better crop? or by which method will less labour raise a better crop? Besides, however, the effect of the method on the crop on the ground, the farmer should also regard its effect on the succeeding crop, and on the general state of his land. That method of cultivating any given crop is certainly the most advantageous, which will not only secure a greater quantity of it, at less expense and labour, but will also make or keep the land in such a condition, as will secure good subsequent crops, also at less expense and labour. These considerations ought to be kept in view, in discussing the question respecting the comparative merits of the drill and broad-cast turnip husbandry.

There can be little doubt, that the most effectual method of raising the greatest produce off any given quantity of land, would be, to set the seeds or plants exactly at equal distances from one another, all over it: each plant would thus derive equal benefit from the manure and the atmosphere. As, however, the increase of produce would not compensate for the increase of expense attending this method (except perhaps in very particular circumstances and cases), the mode that comes nearest to it is to be preferred. This mode is that of the row culture: by means of it the ground may be covered much more equally, at less expense than it could be by the broad-cast method: if the plants do not fail, they may be set out in such a manner, that every square yard of the field may have an equal number. If, therefore, there are no objections to the row culture on other points, it may safely be used, as promising not only a heavier, but a more even crop than can be raised in the broad-cast method. From the nature of turnips, it seems peculiarly suited to them: both the leaf and the root *spread* in growing, and derive a considerable proportion of their nourishment from the atmosphere. By having the manure also placed immediately under them, they not only get *all* the benefit of it, but (what perhaps is a matter of equal importance) they grow much more quickly out of the reach of the fly *.

But the question respecting the superior advantages of drilling turnips, does not rest entirely on presumptive reasoning: by repeated experiments, it has been ascertained, that a greater weight will be raised by sowing turnips in drills, with the dung immediately under them, than can be done in the common manner. The bailiff of Mr. Page, of Pointers, weighed one rood of drilled turnips against one rood of turnips sown on six-bout lands: the drilled turnips weighed 240 lb.; the broad-cast only 184 lb. This experiment agrees with all that have been carefully made on the subject. It is not denied, that if a broad-cast crop of turnips were hoed out at proper and equal distances, the weight would be greater than could be raised by the drill husbandry; but taking the expense and weight jointly, the profit would not be so great.

---

* When the manure is spread over all the field, it is evident that a much greater surface is exposed to the atmosphere, than when the same quantity is put in the bottom of the drills: of course, during the hoeing of the turnips, a much greater quantity will be lost by evaporation the former way than the latter; and if we suppose an equal quantity of land in two turnip fields, one drilled, the other broad-cast, to fail entirely, it is evident that during the summer, the latter will lose more of its manure than the former.

With respect to the comparative expense of the two methods, this may be considered either as it regards the manure or the labour. From the circumstance of the manure being applied exclusively to the roots of the turnip, it is plain that less manure will suffice, at least for that crop; and from the circumstance of the manured surface that is exposed to the atmosphere being less, it is reasonable to think, that the subseqnent crops will in fact derive as much benefit from the smaller quantity of manure applied to the drills of the turnips, as they would do from what remained of the larger quantity, spread over the whole ground. In the turnip districts in Northumberland, Berwickshire, and East Lothian, where this crop is always drilled, it is often the practice to draw and cart off half the crop, in order to prevent the following crop from being lodged by the too great richness of the ground. This, I believe, seldom or never is the case in the broad-cast districts; and whether it be regarded as a proof of the superiority of the crop, or that less manure is necessary for the turnip and subsequent crops, it is equally decisive in favour of the row culture. It has been objected to putting the manure in the drills, that it would not afterwards be equally spread over the ground; but, beside that the inference to be drawn from the practice just mentioned, is directly against this objection, it may be remarked, that the manure supplied by the sheep naturally falls between the drills, or on the parts not before manured. It is also the practice, wherever the situation of the field and the nature of the soil will admit

mit of it, to draw the turnip-drills across the common ridges; of course, when the ground is ridged up for the following crop, the manure is spread over the whole of it.

With regard to the saving of labour, the question admits of a more decisive reply. In the first place, not more than one-third of the hand-labour is required, at the highest computation: the horse-hoe and the single-horse plough are employed to clean the spaces between the drills; the saving, therefore, so far as regards the quantity to be gone over with the hand-hoe, must be very great, besides the greater certainty of having it well done by the horse-hoe. In the second place, what is hand-hoed, is done with more dispatch and less trouble, and consequently at less expense, than can be done in the broad-cast method: in the one case, the hoer has merely to go straight forward, with all the plants before him in a line; in the other, it requires a great deal of practice to get into the best method of thinning and hoeing plants that lie in every direction, so that no part of the ground shall be missed; that all the plants shall be *set out*, as nearly as possible, at equal distances; and that both these operations shall be done without the necessity of going backward and forward. Where the turnips are drilled, women and boys are found to be sufficient to hoe them; and they are finished more expeditiously, and in a more workmanlike manner, than they are in general, with much more expense, in the broad-cast method. In the neighbourhood of London, and indeed in almost every part of Surrey, where there is such a general and well-founded complaint, that a sufficient number of workmen cannot be got, it is surely advisable to introduce horse-hoeing, wherever it can be done with advantage, instead of hand-hoeing. This argument derives additional weight, from the circumstance of the hoeing of turnips very commonly interfering with the harvest, when of course, every hand that can possibly be spared, ought to be employed in the latter.

With respect to the last view of the subject, the preparation that the ground receives for the subsequent crops, under the two different modes of growing turnips; there can be no doubt, that hand-labour employed on land *might* render it more productive than any ploughing could do: but, on the other hand, it is equally certain, that in no instance, on the large scale of cultivating turnips adopted by the farmer, is hand-labour bestowed to such an extent, or with such care, as to equal horse-hoeing properly performed: nor, indeed, would hand-labour pay. In general, the preparation for the subsequent crops, given to drilled turnips, is superior to that given to broad-cast turnips; and in every case, it is much cheaper. It is of the greatest importance to hoe and clean turnips as early as possible, both in order to secure the crop, in case of wet weather, from the weeds choaking them, and to give them the immediate use of the whole manure. A man, with one horse, can, by means of the scraper or horse-hoe, easily clean three or four acres a day; while the drills themselves may be hoed and thinned at one half of the expense attending the broad-cast method. In case, therefore, that there is reason to apprehend a wet summer, the turnips can be got more quickly out of danger: and it need hardly be stated, that the better the crop of turnips, and the cleaner they are made, the greater reason is there to expect good crops during the remainder of the rotation.

After all, the price that is given for turnips in similar situations, is the best criterion of the merits of the manner in which they have been cultivated, provided the extra price is not eaten up by the extra expense: this there is no reason to believe to be the case in the drill method: spreading the manure in the drills may be done for 6*d*. or 8*d*. per acre, more than the common method: the horse and hand-hoeings necessary to the drilled turnips, will not amount to 13*s*. or 14*s*. per acre, the price usually given for two hoeings, even at a considerable distance from London: while, on the other hand, 3*l*. per acre is reckoned an high price for turnips to be folded off by sheep: 40*s*. or 45*s*. is much more common, and the latter may be considered a high average. In the Northern counties, 5*l*. is by no means a high average for turnips to be eaten on the ground: 8*l*. and 9*l*. is often given.

Lastly, it may be observed, that the broad-cast system has given way within these thirty years, to the drill system in Northumberland, and all the south eastern counties of Scotland. It is perhaps, unfair to argue, that any one mode of cultivation is better than another, merely because it is adopted in the best farmed counties of the kingdom; but when one mode has been tried, and has universally given way to a different mode, among farmers who are not only very enlightened, but as free from prejudice and as keen on profit, as any set of men, it is certainly a fair inference, that the system last adopted is better suited to the great object of all enterprise and labour, than the former was.

It certainly is worth the while of the Surrey farmers, who depend so much on their flocks, to ascertain for themselves the comparative merits of the two systems of turnip husbandry: and if it should turn out, after conducting the drill system in every respect according

Digitized by Google

to the Northumberland method, that it is inferior to the broad-cast, they then may pursue *their old method*, with the satisfactory conviction that they *have found it* to be also *the best*. It is proper to remark, that on the strong soils on which turnips are frequently grown in Surrey, in all probability the drilling of turnips would not succeed: if turnips are to be grown on such soils, the broad-cast method is perhaps the best.

*Sort.*—The sort most commonly sown is the white round: its deep root gives it a good hold of the ground during the winter: it is very sweet, and much used by the cow-keepers: in case, however, the winter is mild, it is very apt to shoot. The tankard, red round, and green round, are also grown. The yellow turnip does not appear to be known in Surrey; nor, as far as I have been able to learn, in the neighbourhood of London: it has been cultivated for some years in the gardens in Scotland, and has lately been introduced into the fields in Banffshire, and some other counties: when grown in the garden, it is much smaller than the other kinds, but it is said that the size may be greatly increased: it is remarkably sweet and juicy, particularly in the spring, when the other kinds become dry or spongy: it stands the frost nearly as well as the Swedish turnip, and as it does not require so much manure, it has been proposed to substitute it instead of the Swedish. I have known a good crop of them grown in the intervals between drilled beans; a mode that might be adopted with success, where feed is of great consequence, and where it was not intended to plough the bean stubble for wheat.

*Seed.*—Two pounds is the usual allowance for an acre: but, as it is difficult to get turnip seed sound and pure, it is perhaps the safest way, to give rather more than less than two pounds. It is very difficult to preserve the seed of any particular kind, or even of the Swedish kind, unmixed, if any other kind, growing near it, is kept for seed: the farina of the one kind is apt to impregnate the other, and consequently the seed, when sown, will disappoint the farmer*. In order to scatter the seed more equally over the ground, the Norfolk sowing turnip machine is used: it is simply a box ten feet long, and about two feet and a half broad and deep, with sixteen holes in it at regular distances, sufficiently large to admit one seed to pass through easily: it is slung over the shoulders of the sower, who shakes it from side to side as he walks along.

*Rolling and Harrowing.*—A light pair of harrows is always used to cover the seed: this is succeeded by the roller: in moist soils, or low situations, the ground is then water-furrowed. As soon as the crop appears to have generally got the rough leaf, the harrows are again used: by this means the soil is loosened, many of the seed weeds are destroyed, and the plants are in some degree thinned.

*Fly. Slug. Caterpillar.*—All these insects are complained

---

* Seed that had been bought of a respectable seedsman by a farmer in Kirkcudbrightshire, as the seed of Swedish turnip, produced plants that were certainly not Swedish, though evidently allied to that species: in a lawsuit that took place in consequence of the supposed fraud, the seedsman satisfactorily proved, that the seed had been gathered from the real Swedish turnips: but on inquiry, it was found, that in an adjoining field or garden, the common turnip was standing for seed at the same time.

Digitized by Google

plained of in Surrey, as enemies to their turnips. Scarcely is the turnip above the ground, before it is attacked either by the fly or the grey slug; and if it escapes from them, in the course of six or eight weeks the caterpillar makes its appearance, and commits dreadful devastation. I heard of no remedy that was certainly effectual against any of these insects: many have been recommended as completely answering the purpose, but as they have all been found to fail in most instances, it is fair to presume, that if the crop was at any time saved when they were used, the preservation of it ought not to be attributed to them, but to causes beyond our detection, and probably beyond our controul or management: any mode that will secure a rapid growth, will best preserve turnips from the slug or fly; of course, early sowing, pulverizing the soil well, or putting in the seed deeper than usual, where the ground is found to be moist below, are the best securities. There is no remedy that can be applied against the caterpillar, on a scale sufficiently large, and that will operate with sufficient quickness. Rolling by night will certainly kill some of the caterpillars, and of course, save some part of the turnips. The farmer, however, should not despair of the recovery of his turnips, even though they should be eaten almost bare by the caterpillar; there have been many instances of a very good crop having been got, by the timely falling of rain, when they were in this apparently desperate condition.

*Hoeing.*—This operation is always carefully performed twice; and in some particular circumstances, a third hoeing is given. The first hoeing is given soon after the rough leaf is formed: it is performed by a nine-inch hoe, and is used not only to loosen and clean the ground, but to set out the plants at the proper distance: this is generally a foot or sixteen inches. The time of the second hoeing depends of course upon the growth of the plants: sometimes it takes place in the middle of September; in other years, it is not required till the beginning or middle of October. As the hoer can now get round each plant, the soil about them is thoroughly loosened, and every weed is cut up by the roots. Both these hoeings are generally performed in a very careful and superior manner, and extend as well over the parts where the turnip crop has failed, as over those where it is the thickest. Turnips are almost always hoed at so much per acre, and the same persons commonly contract for both the hoeings: from 12*s*. to 15*s*. is the usual price given for both hoeings: where they are taken separately, 1*s*. or 1*s*. 6*d*. per acre more is given for the first hoeing than for the second. An expert, active, and steady man, will hoe half an acre in a day, if the land be not very foul or very strong.

*Consumption*.—The purposes to which turnips are applied, depend in a great measure on the distance of the farm from the metropolis; and in some respects, on the nature of the soil on which they are grown.

The greatest part of those in the immediate vicinity of London, go to the supply of Covent Garden and the other markets: those at the distance of twelve or fourteen miles are partly bought by the great cow-keepers, and partly consumed by the stock of the grower, or lett to such farmers as have not a sufficiency of feed. Turnips beyond the distance of fourteen miles, in Surrey at least, may be considered as grown for the winter feed of stock, unless in those parts of the county which border on the Thames: from these they are often brought in barges for the supply of the London markets, and for the use of the cow-keepers.

Such turnips as are sold to the cow-keepers, or for the market, are of course drawn; but unless in these instances, it is by no means common to draw the turnips. They are, however, sometimes drawn and fed on an adjoining ley field, when the soil on which they are grown is wet: indeed, in this case, there is no other mode of using them without poaching the ground, unless the opportunity of a frost is taken, and the sheep are then folded on the turnips: this is perhaps more frequently done where the land is wet, as few farmers are willing to rob the land by drawing the turnips, if they can possibly prevent it.

Hurdling is in very general use: indeed it very seldom happens that sheep are put loose on a field of turnips.

An instrument for taking up this root, and cutting it into slices, has lately been invented, and is now in pretty general use in the south-western part of the county. The following is Mr. Malcolm's description of it:

"The hoe is first made like the common nine-inch garden-hoe, forming an oblong square, with an eye to receive the handle: from the centre of the first hoe, another hoe crosses it at right angles, but this second hoe is not made solid as in the first common hoe, but is made like a Dutch hoe, the centre part of it being open the whole length of it. The turnip being pulled out of the ground by the angles of the hoe, is immediately struck with it about the centre, which divides it into four; and if these four pieces are not made small enough, the stroke is repeated upon each of the pieces until they are sufficiently so."—By means of this instrument, the lambs and toothless ewes are enabled to feed nearly as well as the rest of the flock: and if the labour attending the use of it is not an objection to its introduction on a very large scale, it would be of great service to all the flock, since there can be no doubt that all animals, and especially such as ruminate, will fatten more quickly, if they were enabled to fill themselves with less trouble, and in less time.

It seems pretty well determined by experiment, that where hands can be procured, an acre of turnips will go much farther in fattening cattle in the stall, than in the field; and the extra quantity of manure, beside the more judicious and equal application of it, will more than pay for the extra labour. It remains to be ascertained, whether even for sheep-feeding, turnips would not pay better, *i. e.* whether the fattening of the sheep would not be more certain, and considerably quicker, and the manure procured much greater, if they were drawn, and the sheep fed in permanent folds well littered, or in the straw-yard, if it would contain them, than they do now, by the sheep being folded upon them. Such an experiment cannot, however, be made to any great extent in Surrey: the farmers there acknowledge the benefit that would be derived from many practices; but they are prevented from adopting them, not so much from the high price of labour, as from the impossibility of procuring a sufficiency of hands.

It is a very general remark in this county (and probably the fact has been noticed in other turnip districts), that the barley is much better where the turnips have covered the ground well, than on those parts where the turnips had completely failed. This, at first sight, seems to favour the opinion, that turnips, so far from being an exhausting, are an enriching crop; but, on consideration, the only conclusion we shall feel ourselves justified in drawing, will probably be the following: that the quantity of manure lost from the uncovered ground, by evaporation, during the autumn and winter, is greater than what the ground with a crop on it is deprived of, provided that crop is fed off. There can be little doubt that the turnips draw more manure from the soil, than it could possibly lose by evaporation; and if the turnips were drawn, we should find that part which had been without a crop, more productive the next year than that part on which the turnips had succeeded: but the sheep folded on the turnips give back such a portion of the manure, as renders that part of the field which without them would be the poorest, in fact in the best condition. Besides, it ought to be remarked, that the turnips derive no inconsiderable part of their nourishment from rain, or the moisture of the atmosphere: the difference evident in their appearance and growth, when the weather is sultry and dry, and when it is moist and at the same time warm, proves this sufficiently; it is also evident, from the peculiar smell they exhale after a shower, which seems to arise from the decomposition that takes place during the process of their growth. The quantity of manure, therefore, which is taken up by the turnip, is probably not so great as is generally imagined. From the facts already stated respecting the state of the weather most favourable to their growth, as well as from the quantity of water which they contain, we should be led to draw this conclusion: and the exhaustion of manure, which takes place where turnips have been drawn, may at least in some degree be accounted for, from the fineness of the soil on which they are grown, and the frequent exposure of its surface to the influence of the atmosphere, by the hoeings it receives.

*Value. Price.*—It i calculated, that an acre of turnips will support from 100 to 250 sheep a-week: the exact number will depend upon the goodness of the crop, the kind of sheep, and the condition in which they are when they are put on the turnips. It is the opinion of some of the most experienced farmers in Surrey, that taking the average crop of turnips, and the condition in which sheep are generally put upon them, an acre cannot be considered as capable of fattening more than five. This seems a very low average number, but it does not probably fall much, if at all, short of the truth.

When turnips are lett to be folded off, it is either at so much per acre, or at so much per sheep for the week: about two guineas is the usual price per acre: when a particular field is uncommonly good, or the turnips in general have failed, three or four guineas have been given. The manure may be reckoned worth nearly *3l.* per acre. The price that is paid per week depends either on the distance of the turnips from the farmer who needs them, or on the time when they are to be fed off. If the agreement is, that they are to be fed off by the beginning of November, in order that the land may be sown with wheat, *2d.* a head per week is the common price; if the buyer is allowed till spring to feed them off, the price varies from *3d.* to *6d.* per head per week, according to the demand and the conveniency of situation. If we take *4d.* a head as the average price, and 150 as the average number that an acre will support for a week, it will give us 50*s*. as the price received per acre.

With respect to the weight of turnips grown on an acre, it is not so easy to ascertain it. I heard of but few experiments on this head. The bailiff of Mr. Page, of Pointers, considers 400 bushels, of 50 lb. each, as a good crop: this is nearly nine ton per acre. In an experiment, however, between drilled turnips, and turnips grown on six-bout lands, he had 184 lb. of the latter on one rood of ground, which is rather more than 13 ton per acre. If we suppose that an acre will keep 150 sheep a week, and that, on an average, each sheep will eat 16 lb. per day, or 1 cwt. a-week, the weight of an acre of turnips will be seven ton and a half.

When turnips are sold to be drawn off the field, ten and twelve guineas per acre are very commonly given by the cow-feeders: where they are drawn and bunched for market, they will produce, at 2*d*. per gallon, 26*l*. per acre; as they are, however, oftener sold for 4*d*. a gallon, the acre may fairly be reckoned worth 40*l*.

Stubble-turnips are cultivated very extensively in Surrey: though this crop, in some years, grows but to a very small size, yet in the neighbourhood of London at all times, and even in the more distant parts of the county, it is often valuable. If they can be sown early in September, and the autumn prove moist and warm, they sometimes reach a tolerable size.

They are sown on the stubble land generally without manure, though in several instances near London, I saw manure applied in great abundance, and that too on land which was excessively foul. In such a case, stubble-turnips are a disgrace to the farmer, as well as a real loss. How much ought the farmers in Surrey and the southern parts of England to prize their climate: a farmer in the North often with difficulty saves his crop of corn, while they get their crop off the ground sufficiently early to obtain a second crop.

## SECT. XIV.—RAPE.

THIS plant is not cultivated to any great extent in Surrey, nor does the breadth of land that is annually sown with it, appear to be much increasing. It certainly is not nearly so bulky a crop as turnips; though from the superior nourishment it affords, there is good reason to suppose that an acre of it, if it were managed with equal care, and had equal justice done to it in the preparation and manuring of the soil, would support as many, and fatten more sheep.

*Soil.*—It is grown on almost every variety of soil; but perhaps the greater breadth of this plant is sown on land that is either too thin, or too strong and wet for turnips. It is indeed one great advantage of this crop, that it is not so nice with respect to soil as turnips are.

*Tillage.*—Three or four ploughings are generally given: the first, rather shallow, before the beginning of winter; the second, to the depth of six or eight inches, or more, according to the nature of the subsoil, in March, after the ground has been well broken by the drag-harrow: it then lies rough for two or three weeks, when it is harrowed, rolled, and gathered, and the manure or lime (which is more commonly given to this crop than to turnips) is laid on: a shallow ploughing is then given, and the land, if wet, is laid up into ridges: some sow it on the rough furrow; others harrow the ground before the seed is sown. When four ploughings are given, two instead of one are taken, within a short time of each other, before seed-time.

*Time.*—As the rape that is cultivated in Surrey is generally intended for spring-feed, and to be succeeded by barley, it is not sown so early as in those counties where it is fed off in the course of October for wheat. June and July are the months in which the greatest part of the rape-seed is sown: when it is deferred till the end of July, the success of the crop is very uncertain. The crop would probably fail very seldom, if the time of sowing were never put off beyond Midsummer. Where it is cultivated to a very great extent, or where many turnips are grown on the same farm, it is advisable to sow at different times, in order to secure a regular succession of winter and spring feed.

*Seed.*—The quantity of seed varies from one quart to half a peck per acre.

*Hoeing.*—This is too often neglected in Surrey: many crops of rape may be seen very foul, both with seed and root weeds. Hand-hoeing could not effectually destroy the latter: where they appear, it is plain that a proper preparation has not been given the ground. But hand-hoeing might easily destroy the former; and as this plant does not cover the ground so much as turnips do, and of course, during no part of its growth is so well able to cope with the weeds, hand-hoeing seems more necessary to it than to turnips. That it does not get it so often or so carefully as it should, is probably owing to the greater expense (the plants requiring to be set out with greater nicety, and with a narrower hoe), and in some measure to the turnips, a much more important and extensive crop, requiring all the spare hands about the time when the rape should be hoed.

As rape is never grown in Surrey for the seed, or sold on the ground as turnips are, it is not very easy to ascertain its value. This indeed might be done, if it were sown in such quantity as to be the sole or chief dependence of the farmer for his sheep; but as it always bears a very small proportion to the turnips, and is used to fatten sheep along with them, it is almost impossible to fix accurately its positive value as a feeding crop: as it is managed in Surrey, there can be little doubt that it is inferior, in this respect, to turnips.

Mr. Birkbeck, of Wanborough, who cultivates a considerable extent of rape, puts his sheep upon it more early than is usually done: as they are suffered to go over the whole field, he finds that they eat the leaves that grow nearest the ground, and leave the others untouched till these are all consumed. As soon as he perceives that all the plants are deprived of the ground leaves, he takes his flock off the field. Two advantages result from this management: if these leaves were not eaten at that time, they would wither, and become useless: his sheep thus get more food from the rape than they otherwise would do, while at the same time, the other leaves of the rape are found to grow more rapidly and luxuriantly.

## SECT. XV.—CABBAGES.

The cultivation of cabbages is confined almost entirely to the market and farming gardeners, and to the cow-keepers in Camberwell, Lambeth, Wandsworth, and most of the parishes within five or six miles of London.

*Soil.*—As manure in great abundance is made, or can be easily procured by those who grow this plant, the soil, provided it be sufficiently deep, is not a matter of much consequence: the largest crops, however, are generally got with the least expense of manure, on the strong soils of Camberwell, Peckham, &c.

*Nursery.*—The ground that is intended for this purpose should be rich, well sheltered, and dry, in order that the seeds may vegetate kindly and equally. The beds are commonly made about four feet broad; on these the seed is sown rather thin, if the goodness of it can be depended upon: it is covered lightly with the earth, well pulverized, taken out of the intervals between the beds. The proper season for sowing depends upon the time when it is intended to make use of the crop: if it is intended for use in March or April, the seed must be sown in February or March before; if the cabbages are to be drawn early in the winter, the seed should be sown in September or October. The proper season for transplanting will also depend upon the time of sowing: if they have been sown before winter, and the weather is at all favourable, such as we have often in October, they will be fit to transplant in a much shorter space of time than they generally are, if sown in March, especially if the spring be cold and backward. When they are transplanted, they should be put in ground well prepared, at the distance of about six inches: it is often advisable to water them after they are transplanted, in order to hasten their striking root.

*Tillage.*—Repeated deep ploughings are absolutely necessary, in order to secure a good crop of cabbages: three, and often four ploughings, are given in Surrey—the first before winter, in the direction of the ridges; the second, in January or February, to the depth of 20 inches, if the soil will admit of that depth, either with a trench-plough, or what is better, with one plough following another in the same furrow: if the land is not in proper condition, another deep ploughing should be given: these two or three ploughings, if the drag-harrow and roller have been properly applied, will leave it in a proper state for the manure.

*Manuring.*—Cow-dung is generally applied to cabbages, where it can be got in sufficient quantity: sometimes a rich compost is used: at least one half more manure is given to cabbages than to turnips, or about 30 cubical yards.

*Planting.*—After the manure is spread, the ground is ploughed to the depth of six or seven inches; generally flat, unless it be very wet, when it is laid up into broad ridges. After it is harrowed and rolled, the drills are drawn at the distance of three feet, either with a light swing plough, or with a hoe and line, to the depth of three or four inches. April and May are the months in which most of the cabbages are planted. The distance in the rows is commonly the same as that of the rows from each other, if they be three feet: if the drills are at a greater distance, the distance of the plants in the rows is rather less. In order that the plants may have as much as possible, equal benefit from the air, they are put into the second and fourth drills, half way between the plants that are in the first and third drills. This mode, no doubt, gives every plant more room and air, but it prevents the ground being wrought by the horse-hoe, both along and across the ridges, which might easily be done if the plants were set in a line in both directions.

*Horse and Hand-hoeing.*—Cabbages are generally hoed twice with the hand-hoe, and earthed up twice with the plough: the hand-hoeings are given before the plough is used: the first in about three or four weeks after the cabbages are planted: the second; as soon after the first as they appear to require it, commonly in a month. The first ploughing is given immediately after the second hand-hoeing; and they are again earthed up about four or five weeks afterwards. Where, however, it is intended to secure a good crop, much more labour seems necessary: besides the two hand-hoeings, the scraper or nidget, of a greater width, and with more shares or hoes than common, might be used among cabbages with great advantage. If the mode of setting them at equal distances both along and across the ridges, were adopted, the plants might be earthed up equally well on *all sides;* this, and the use of the scraper, would most probably secure better crops at less expense.

*Consumption.*—Cabbages are either carted to the market, or given to milch-cows. In this county they are scarcely ever given to fattening stock. As long as the cabbages are fresh and sound, they do not taste the milk or butter; but when they begin to rot, or if the rotten leaves are not carefully gathered off, the milk and butter are affected.

*Produce.*—The weight of an acre of good cabbages, greatly exceeds that of turnips: this is certainly owing, in some measure, to their greater compactness and solidity; but it is probably also owing partly to the drill mode in which they are cultivated, and the greater quantity of manure given them. It is no uncommon thing to raise cabbages that will weigh 40lbs.: if we suppose the cabbages on an acre to weigh on an average, 20lb. a piece, it will produce 43 ton, supposing one cabbage on each square yard: greater crops than even this are frequently grown by the Surrey farming gardeners.

## SECT. XVI.—SWEDISH TURNIP.

In proportion to the attention and capital judiciously laid out on sheep, the farmer is not only directly benefited by the increased value of his flock, but he is also a great gainer by the kinds and course of crops, which a large or a valuable stock obliges him to adopt for their sustenance. The value of green crops, depends not merely upon the food they supply for the cattle or sheep of the farmer, and the greater quantity of manure he is thus enabled to command: the judicious intermixture of them with his crops of corn, renders summer-fallow unnecessary on many kinds of soil; and where its use is still indispensable, it is a work of less expense and labour, as well as of less frequent recurrence.

Wherever, therefore, the culture of green crops is extending, and their value is beginning to be better known, there is every reason to conclude, that agriculture is improving. If these observations be correct, Surrey must be considered as an improving county; since, a very few years ago, scarcely an acre of Swedish turnips were to be seen, except on the farms of some gentlemen; and now, there is scarcely a farmer who grows any considerable quantity of the common turnip, but what has also several acres of the Swedish.

*Soil.*—It is found that the Swedish turnip requires a soil rather of a better quality than the common turnip; while, on the other hand, it is not so much injured by a wet bottom. Provided, therefore, a greater quantity of manure be applied, in order to raise the soil to the proper degree of richness, the Swedish turnip may be successfully cultivated where it would be imprudent to venture the common kind.

*Tillage.*—This differs in no respect from what is given to the common turnip; only, as it is necessary to sow it rather earlier, the ground may not always be so well prepared for it. On this account, as well as on account of the success and advantage which has attended the practice itself, it might be advisable to transplant the Swedish turnip: at least, whenever there was reason to suspect that the land was not cleaned and dressed so well as it ought to have been.

*Transplanting.*—Where this is intended, the seed should be sown in a piece of ground well prepared, by the middle of April: the plants may be taken up by the middle or end of June: beside the advantage of getting the land better prepared, one hoeing will be saved; and this saving will more than pay for the expense of transplanting: Swedish turnips managed in this way, are not so apt to shoot, and in most seasons are a more certain crop.

Where it is not meant to transplant them, they are generally sown in Surrey before the common turnip: towards the end of June or beginning of July.

*Hand-hoeing.*—As the growth of the ruta baga is much slower than that of the common turnip, the first hoeing is given to them later: in consequence of this, the seed-weeds get to a greater height and become more numerous, and the expense per acre, for the first hoeing, is rather more than for the first hoeing of the common turnip. The Surrey farmers entertain an opposite opinion to the farmers in the North, respecting the distance at which the plants should be set from each other: in the North, the drills for the Swedish are drawn three or four inches narrower than for the common turnip; and the plants are left nearer to one another: the Surrey farmers, on the other hand, hoe them out to a greater distance than they do the common turnips. They alledge that they grow larger, and therefore require more room. The haulm of the Swedish certainly does not spread so much; and probably the bulb of the common turnip would increase in size as much as the other, if equal room were allowed them: to do them strict justice, a greater space ought perhaps to be given the common turnip, since the greater luxuriancy of its haulm, will otherwise soon exclude the air from its bulb.

*Application.*—They come in for sheep-feed between the common turnip and the tares or grass. Some farmers give them to their work-horses, but this practice is by no means so common as it deserves to be. Moist food for work-horses is very much wanted during the winter; and if every thing is taken into consideration, the Swedish turnip will be found the most convenient and advantageous. Carrots will grow only on particular soils: their culture and taking up are very troublesome and expensive. The large and coarse potatoe are a very cumbersome crop; and unless they are boiled or steamed, they are not very wholesome for work-horses. The Swedish turnip, on the other hand, will grow on most soils well prepared: they can be kept in the ground, and taken up as they are wanted; or preserved (after having their tops cut off) in stacks of the form of the ridge of a house, covered well with straw or turf: horses may be brought to eat them with a little management; and in their effect on their health and strength, they are little, if at all, inferior to carrots or boiled potatoes.

*Comparison with Turnips.*—During the winter they are not considered as equal feeding to turnips: they are then harder, drier, and tougher; of course they are not so much relished: the cattle or sheep can not fill themselves on them in so short a space of time, or with so little trouble as they can on the common turnip, and therefore will not fatten so kindly or so soon on them. In the spring, the advantage is decidedly in their favour: the turnips are then hard and stringy, or dry and spongy: while the ruta baga is in its perfection; more tender than it was in winter, and the juices more easily expressed. The following experiments and observations set the superior value of the Swedish turnip, at least as spring food, in a very clear light, and as far as a single set of experiments can go, are perfectly conclusive in their favour.

"I put a score of tups upon cut ruta baga, and at the end of six weeks, observing they had eaten a considerable less bulk of those than they would have done of common turnips in the same period, this awakened my curiosity to know what weight they would eat of each kind in the same given time. For this purpose I put four tups in one parcel, and eight draft or shot ewes in another, and began to give them common turnips (freed from their fibrous roots and tops) on the 16th of March.

"In eight days the four tups eat of common turnips, 1003lb. which, on an average, is 31⅓lb. per day, each sheep. The eight ewes, in eight days eat of the same turnips, 985lb. which on an average, is nearly 15⅜lb. per day, each ewe.

"The whole were then put to ruta baga, cut into oblong and dice-like pieces, and weighed, and given regularly three times a day.

"The four tups eat of this cut ruta baga, 553lb. in eight days, which is, on an average, 17¼lb. per day, for each sheep.

"The eight ewes eat of the same, 544lb. in eight days, or, on an average, 8½lb. per ewe, each day.

"I am well aware of the fallacy of making hasty decisions from single experiments; and before any conclusions can be properly drawn, the experiment should begin in November, and be continued regularly through the winter. As it is well known that common turnips grow lighter and less succulent in the spring months, than they are in the earlier part of winter, therefore it is probable, the difference would have been less at that season. But so far as this experiment goes, it appears that in March, sheep will eat nearly double the weight of common turnips that they will of ruta baga; and of course, that a crop of ruta baga, which from appearance is only half as good as a crop of common turnips, may probably be of more value, as they will not only keep the same number of sheep, but, it is presumed, will feed them much fatter; at least, this is the opinion of all the great tup-breeders, who think they make their sheep much fatter with ruta baga, than they ever can with common turnips; and the decided preference which sheep give to ruta baga, when they have their choice of both roots, is another strong argument in its favour*."

With regard to the common supposition, that a crop of turnips is generally heavier than a crop of ruta baga, there appears to be some mistake, arising from confounding bulk with weight. It has been ascertained, that taking equal bulks of both crops, the weight of the ruta baga is nearly one-third greater than that of the common turnip; and if it be considered, that the greater bulk of the turnip crop arises principally from the greater quantity of haulm, it may justly be expected that the weight of each crop will be nearly equal, on ground managed in the same way.

---

* Farmer's Magazine, May, 1802, No. X. p. 223.

If to these advantages of this root it be added, that it is particularly grateful and nourishing to lambs, it will be found to have as strong and just a claim to the attention and cultivation of the farmer, as any other green crop.

## SECT. XVII.—SIBERIAN TURNIPS.

For the following account of this vegetable, which has been successively cultivated by Mr. Pennington, of Lee Place, near Godstone, I am indebted to Mr. Salisbury, of the Botanic-garden, Brompton, who has witnessed the good properties of it, both at his friend Mr. Pennington's, and in his own garden. I am happy to state, that Mr. Salisbury is preparing for the press a work, which his known ability and experience must render highly useful to farmers, on the proper soils, the due portion of seed, and the best management of all the different agricultural crops.

The Siberian turnip is a variety between the cabbage and turnip, but it differs from the Swedish turnip in growing to a larger size in the root, which is very sweet and nutritious, although equally hardy with the root of the Swedish turnip: it is superior to this in one important point, as it produces a greater quantity of foliage in the spring. The tops of it branch into a great number of ramifications, and when full grown, it sometimes reaches the height of five feet, and covers a space five feet square. It therefore may justly be regarded as better than all the others of this kind for a late crop, and for supplying a deficiency that is always felt by the feeders of cattle, after the time of the going out of the turnips till the winter tares come in.

It will bear cutting and carrying from off the ground for a considerable time during the spring; and even after the seeds have been perfected on the stalks, the root has been perfectly sound, and cattle have been known to eat it with an unparalleled degree of avidity.

Two pounds of seed should be given to the acre in the beginning of June; and the management of the turnip is applicable to this crop, excepting that it will bear transplanting in the month of July or August, and therefore it affords the land more time for the purpose of being prepared and cleaned—an advantage of very great importance to the farmer.

As the Siberian turnips grow to a large size, the plants should be hoed out to the distance of 18 inches, and if transplanted, they should be set at the distance of two feet: if this method is followed, they will grow much better, and reach a much larger size, than if they were left where they had been sown.

All sorts of cattle are particularly fond of it; and it is also a tolerably good vegetable for the table, especially the tops in the spring of the year.

## SECT. XVIII.—CARROTS.

This valuable root appears to have been brought into this island before turnips; and there is good reason to believe that we are indebted for its first introduction, and the mode of cultivating it, to some Flemings, who settled about Sandwich, in Kent, in the reign of Queen Elizabeth. It naturally found its way into all the soils calculated to grow it in perfection, within the influence of the London market. Chertsey and Weybridge were the places in the county of Surrey where it was first cultivated; and the former, at least, still grows carrots to a great extent, and of a good quality.

As the increase of luxury made it necessary to set aside the land in the more immediate neighbourhood of London, for more valuable purposes than the raising of carrots, and as the price of labour advanced there in a greater proportion than the price of this and other vegetables, the carrot husbandry, for the supply of the London market, gradually receded farther from the metropolis, and, along with the suckling of calves and the rearing of house-lamb, was taken up by the more distant farmers. The great expense, however, of carriage, will always keep a proportion, at least, of the culture of carrots, turnips, &c. near London; and accordingly we find, that while the carrot husbandry is now found in the remote parts of Surrey, it has not, like the suckling of calves and the rearing of house-lamb, entirely left the districts nearer the metropolis.

The culture of carrots is followed with considerable spirit, skill, and success, and to a considerable extent, in the parishes of Chobham, Horshill, Woking, Purford, Send, Bagshot, Cobham, Esher, Seale, Chertsey, Weybridge, Byfleet, and Elsted. It is impossible to form an accurate notion of the extent of land annually under carrots: it varies very much in different years, as they not only do not form any part of the regular rotation, but, in many of the parishes where they are cultivated, they are not sown, except when the land has become very foul, and requires such a complete cleaning as their culture admits and demands. I have heard it stated upon good authority, that, at a medium crop, 2000 tons of carrots are grown annually in Surrey; this, allowing ten ton to the acre, would give 200 acres as the extent of land under carrots, at an average, every year: this, however, is probably considerably under the truth.

*Soil.*—A very deep and loose soil is necessary for carrots; they are accordingly grown, in all the parishes above-mentioned, on sandy loams. As it is generally thought that they will thrive equally well upon a poor and soft sand, as upon one of superior quality, the natural richness of the ground is not a material object, provided it be free from stones, and of a sufficient depth of soil, of as nearly the same sort as possible. If the general conviction, that carrots do not require a rich soil, is founded in fact (and the concurrent persuasion of the cultivators of this root in all parts of this kingdom, leaves no room to doubt it), it seems an extraordinary circumstance: they contain much more nourishment in an equal weight than turnips; they do not derive nearly so much of their food from the atmosphere as the latter; crops equally heavy, at least, have been raised. One cause may be assigned which will account for the fact, at least in a considerable degree: it is well known, that on soft sandy soils, manure sinks down more easily, and to a greater depth, than on stronger soils; while, therefore, it may lie without the reach of other crops, and therefore may appear to be exhausted, the deep penetrating root of the carrot may be able to reach it.

*Preparation.*—This depends, in some measure, on the

Digitized by Google

the crop which precedes them: the great object, however, of the preparation in all cases, is to loosen the soil to a sufficient depth, and to clear it of root-weeds. It is seldom now thought necessary or advisable, to manure the ground immediately for the carrots: when dung is thought necessary, a small quantity, well rotted, is put in before the second ploughing.

*Tillage.*—In most cases, three ploughings are given for this root: the first, of the common depth, in October or November; the second ploughing is given in February or March: in some cases, this is the trench-ploughing; in others, the trench-ploughing is reserved for the third and last operation, immediately before the seed is sown. After every ploughing, if the weather will admit of it, and the state of the ground requires it, the harrows are used, and the couch-gatherers set to work. When dung is applied, it should not only be well rotten, but completely mixed with the soil by the plough. However the tillage given to ground meant for carrots may vary, according to the nature of the preceding crop, the condition of the ground, or the private opinion of the cultivator, one great object is always in view—a soil completely pulverized, and freed from root-weeds to the depth of twenty inches or two feet.

*Seed.*—The only kind that is sown in the fields is the long orange. As it is difficult to separate the seeds from each other, they are either rubbed between the hands, or thrashed in a sack, till the hairs that make them entangle are separated: sometimes the seed is mixed with sand for the same purpose. There are perhaps no complaints more frequent among farmers, nor more just, than of the badness of carrot-seed. Mr.

Page, of Pointers, always purchases his seed from what is saved and sold by the cottagers: he can depend on its being fresh and well made; whereas, if it is bought from the seedsman, it often is either old, or spoilt in the management. If the seed can be depended upon, four pounds per acre is thought sufficient; if there is reason to doubt the goodness of the seed, or if the land is not exactly suited to carrots, one half more, or at least five pounds, are sown.

*Steeping*—is never used.

*Time.*—They are sown from the beginning of March to the end of April: the exact time is determined, partly by the weather, and partly by the desire to have them coming forward at different seasons. If they can be got in well, the sooner they are sown, the more productive the crop is expected to be, and the better the quality of the root. From the middle of February to the end of March is the best season for sowing carrots, and is getting more common than later sowing.

*Hoeing.*—Carrots always get two hoeings and a hand-weeding: sometimes three hoeings, beside the hand-weeding. The object of the first hoeing is to clear the ground of seed-weeds, as soon as the carrots can be distinguished from them: by the second hoeing, which is generally begun as soon as the first is finished, they are thinned out to the distance of seven or eight inches from each other. A harrowing is sometimes given to the land before the second hoeing, and sometimes a few days after it: this, if it be done with care, and when the soil is in proper condition for it, is of great service, especially if the surface has been battered and caked with rain. A four or five inch hoe is used for the first and second hoeing. These operations require great nicety and attention, and are seldom or never performed, except by experienced men. In the third and last hoeing, a nine-inch hoe is used: every appearance of a weed is carefully to be destroyed, and the plants to be set out at the distance of from 12 to 16 inches by this hoeing. From this account it will be seen, that a great deal of trouble and expense attends a crop of carrots: none of these hoeings, however, could be dispensed with, nor even the weeding (which will be described immediately), except in very favourable circumstances. Carrots have very little chance among seed-weeds: their haulm is so very trifling, lies so close to the ground, and is so little calculated to smother the weeds, that where they are suffered to get up, they soon choke and get the better of the carrots, even though the latter had much the start of them.

*Weeding.*—As from the circumstances just mentioned, the seed-weeds should be completely eradicated from among the carrots, hand-weeding, by which alone this can be done effectually, at least when the carrots are very young, is never omitted by the best cultivators at this period. In 1807, the expenses attending the hoeing and weeding of carrots amounted to two guineas, and in some places to two guineas and a half, per acre.

*Mowing the Tops.*—This is very seldom attempted for the purpose of making hay of them; but it is sometimes practised, in order to feed milch-cows with them green. The effects on the crop, like the effects of mowing the haulm of potatoes, are so differently and oppositely stated, that it is hazardous to draw any general conclusion, either in favour of, or against the practice. It seems probable, that mowing the tops of carrots will not injure the root much, as it evidently depends for its sustenance upon the soil, and little, if at all, on the atmosphere. The different effects attributed to this practice, most likely result from the different states of the crop and of the weather. Three or four tons of good hay are *said* to have been made from the tops of an acre of carrots.

*Taking up.*—The slovenly and hazardous practice of keeping carrots in the ground, and taking them up as they are wanted, is found in some parishes; but in general, they are taken up in November, or whenever they are evidently done growing. In the neighbourhood of Chobham, and in some other parishes, three people are employed, two men and a woman, besides a boy: one man takes up the carrots with a fork with three or four prongs; the other man bunches them; the woman washes them, and the boy carries them from the man who takes them up, to the woman. In order that the buncher and washer may perform their several operations with the most ease and convenience to themselves, two holes are dug in the field, sufficiently deep and wide to permit the persons in them to move round, and to stand nearly breast-high, and so near, that the person in one can easily reach to the person in the other. The buncher has a board placed before him on the surface of the field, and the washer a large tub before her: as soon as the other man has taken up a sufficient number, the boy carries them to the woman; she washes them carefully, and then hands them over to the man, who, after cutting off the haulm and the end of the roots, ties them up in bunches on his board. The man who takes them up, has 5*s.* the load of 40 bushels, for which he is expected to find a boy to carry them to the washer; the other man has also 5*s.*, and the woman 2*s.* the load. This expense, of course, is not incurred, except where the carrots are intended to be sent to the London market. Where they are intended for the use of cattle, the washing and bunching are unnecessary *.

*Produce per Acre.*—This varies considerably, according to the nature of the soil and season, and the care bestowed on the preparation and culture while growing. Eight hundred bushels per acre, each bushel weighing 40 lb. are reckoned an uncommonly good crop—half that quantity is much more common: 600 bushels, or about ten ton and a half, will perhaps be a fair average of the produce of the *farming* carrot husbandry of the county. When carrots are sold upon the ground, they generally bring from 16*l.* to 24*l.* per acre. About Chobham, this year (1807), good carrots brought 20*l.*, and Mr. Page, of Pointers, sold his for 25*l.* per acre.

*Storing.*—There are several different modes of preserving carrots during the winter, after they are taken out of the ground, practised by the farmers of Surrey, according as they have proper and sufficient accommodation within doors, or are destitute of it. The

former

---

* Reckoning the average produce of an acre at fourteen loads, or ten tons, the expense of taking up, washing, and bunching, will amount to 8*l.* 8*s.* per acre: of course, where they are merely to be taken up, the expense per acre will be only 3*l.* 10*s.*

Digitized by Google

former lay clean and dry straw on the floor of some of their out-buildings; they then pack the carrots (the haulm being first cut off) on the straw; and when they have raised the heap as high as they think proper, straw is again laid close upon the top of the heap: where the quantity is not very great, they are preserved in sand. Such farmers as have not room or convenience in their out-buildings, either make a pit in a dry and sandy part of their farm, at the bottom of which they place a considerable quantity of straw, and then put alternate layers of carrots and sand, and upon the top of the last layer of straw, a layer of earth well pressed down; or they put the carrots in an upright position into a trench, and cover them with straw and earth raised up in the form of the ridge of a house. Perhaps the best, and certainly the most expeditious way of storing them, would be to place them on straw laid on the surface of the ground, and not in a pit, to dig a trench entirely round the heap, and to cover it with straw and the earth that was taken from the trench: the ground on which they were placed would thus be much more effectually dry, than if they were buried below the surface, and the trench around them would act as a drain. This mode is found to answer better for potatoes than pitting them, and in all likelihood, the most secure way of preserving potatoes, would be the most secure way of preserving carrots.

*Consumption.*—The greatest part of the carrots that are grown in Surrey, are sent to the London market, even from the distance of Chobham and Elsted: from the former place, they are generally sent by persons called carrot-merchants, who buy them on the ground, and send them to London at the expense of 40*s*.

40*s*. or 50*s*. the load, or 1*s*. the bushel. Very few farmers grow carrots merely for the purpose of feeding their horses or cattle with them: they occasionally buy them at different prices, from 6*d*. to 1*s*. the bushel, and give them to their horses. They are particularly serviceable in the winter, when the horses are necessarily on dry food; their good effects are evident on old horses, by making them plump, and restoring to their skin the smoothness and sleekiness it had lost through age. Mr. Page found them of great use to his Alderney cows, in increasing the quantity, without in the least injuring the quality of their milk. The East India Company buy up a great number of carrots in Surrey as well as in other counties, for the purpose of putting in good condition the horses they send out to India. With the exception of being occasionally given to horses and milch cows, the farmers of Surrey are not in the habit of using them. On the subject, therefore, of the quantity necessary to fatten sheep or oxen, and the manner in which they should be used for that purpose, this county affords no proof or experiments, at least that I could hear of.

*Seed.*—The best seed is supposed to be grown from transplanted roots: for this purpose, the growers of carrots about Purford, Woking, &c. used formerly to select and transplant some of the most vigorous and healthy roots, but as the price of carrot seed is now very low, they are seldom at that trouble. Six or seven hundred weight of seed is commonly got from an acre: the price differs very much, according to the goodness of the seed: 5*l*. down to 2*l*. 10*s*. per cwt. will include most all the qualities.

The above detail comprises the principal particulars of the most common culture of carrots: I only saw or heard of two places in which the culture differed considerably from the preceding statement; viz. at Pepper Harrow, and at Lee Place, near Godstone.

At Pepper Harrow, Lord Middleton generally prefers sowing his carrots on land that has been broken up from old pasture: the manure left by the sheep that depastured the ground, he considers as sufficient for the carrots, and as not nearly so apt to injure or split the root as most other kinds of manure. Both he and Mr. Page frequently take a crop of turnips after the carrots; and sometimes take carrots again after the turnips, folded off.

At Lee Place, Mr. Pennington generally grows every year a few acres of this root, which he constantly drills and horse-hoes; and he finds this mode to answer extremely well. In October 1807, his carrots were a much better crop than most I saw in Surrey, though they had not received so much attention and labour as he commonly bestowed upon them.

It certainly would be a great improvement and advantage, to introduce the drill and horse-hoe into the culture of carrots: a great deal of the labour of hand-weeding and of horse-hoeing would thus be saved; and they might be set out at the distance thought most suitable, with more regularity and ease. A very successful cultivator of them, on a pretty large scale, in the neighbourhood of Edinburgh, grew very large crops of them for several years, constantly drilled and horse-hoed: he generally sold them for upwards of 20*l.* per acre. Another improvement would be, to go back to the mode of taking them up by the plough, which was successfully used when they were first introduced into Norfolk.

Norfolk*. The plough used was narrow shared, in order to keep the carrots from being cut or injured by the broad feathered share of the Norfolk plough: we have known them taken up clean and safe by Small's plough. As the land proper for carrots is always very loose to a great depth, the plough easily separates the carrots from the soil and lifts them up, so that a boy may draw them out without much trouble. If the mode of drilling and horse-hoeing carrots, and of taking them up by the plough, were generally introduced, the objections to the culture of this valuable and useful root, from the great expense and trouble attending it, would in a great measure be removed.

## SECT. XIX.—PARSNIPS.

This root is grown on the rich and deep lands in the parishes bordering on the Thames, principally in that corner of the county which lies between Wandsworth and Kingston. It will thrive well on stronger soils than carrots, provided they are rich, and are rendered loose and open to a proper depth. The preparation of the ground, and the culture of parsnips, are very similar to what is used for carrots: only as they are a more delicate root, and are grown only for the London market, more attention and labour are bestowed upon them. They are preserved in the same manner as carrots. From the greater size of the roots, and the more garden-like culture given them, the produce per acre is larger, on an average, than that of carrots: it will probably reach nearly double, or about twenty tons.

---

* "An account of the culture of carrots, &c. by Robert Billing, farmer at Weasenham, in Norfolk, 1765." Mr. Billing frequently grew thirty acres of carrots.

## SECT. XX.—POTATOES.

POTATOES do not form a regular part of the rotation of any farms except those in the more immediate neighbourhood of London, where indeed they may be regarded as rather the principal crop. They are cultivated in the parishes of Mitcham, Tooting, Streatham, and on the new enclosure of Norwood forest, to a considerable extent; several farmers there have annually between twenty and thirty acres: they are also grown less abundantly on other farms within eight or ten miles of the metropolis.

*Soil.*—The great demand for this vegetable in London, and the high price which it consequently bears, induces many farmers to grow it on soils by no means adapted to it. A wet or strong clay is found to be injurious both to the quantity and the quality of this root: on such soils, they do not *break* when boiled, and are moreover watery and waxey: the produce also is more uncertain, and generally far below what is raised on a free, loamy, or sandy soil. Notwithstanding this is well known and acknowledged by the growers of potatoes in this county, yet the great command of dung they possess, joined to the high price which an acre of potatoes will bring, induces many of them often to crop ground with this root, which is by no means fit for it. Perhaps most of the potatoes that are cultivated

tivated by the Surrey farmers in the neighbourhood of London, are grown on a strong loam, in many places on a retentive subsoil.

*Manuring.*—Some farmers make use of manure very little rotten; while others prefer it completely rotten and fermented. In defence of the former practice it is alledged, that long or unrotten dung keeps the land open, and enables the young potatoes to increase in number and size. On lands naturally fit for this root, or rendered so by repeated ploughings, &c. this is evidently unnecessary, if not prejudicial: on stronger and more cohesive soils, such kind of manure might be advantageously used, to remedy the unfriendly nature of the ground, but it cannot supply food to the plant: and unless there be a sufficiency of food, the young potatoes will neither be abundant nor of any great size, however open and roomy the ground may be about them. Dung well fermented, either by itself or thoroughly and minutely mixed with earth, is, however, more generally used. The quantity given to an acre varies considerably: most frequently the land intended for potatoes is rather over dressed than under dressed. Perhaps fifteen ton, or about twenty-two or twenty-four cubical yards, will average the quantity most generally and successfully employed. One of the most healthy and luxuriant crops of potatoes which I witnessed this autumn (1807), had been manured with rabbit's waste, or furrier's clippings. It was on the farm of Mr. Pennington, at Lee Place, near Godstone.

*Preparation.*—The land is always ploughed repeatedly for this crop; and if the weather will permit, the ground is harrowed, rolled, and gathered after each ploughing. The first as soon as convenient after the preceding crop has been led off the ground, is rather shallow: it is then suffered to lie to encourage the growth of seed-weeds for a few weeks, when it is harrowed and rolled; and the couch ard other root-weeds carefully gathered and burnt: the next ploughing, which takes place immediately after these operations, is deeper than the first: if the weather will admit, it is again ploughed, &c. in February; after this, the manure is carted and spread on the ground, which is ploughed in nine or ten inches deep, about the end of March. The ground now is ready for the potatoes, whether they are to be put in drills, or by the dibble.

Though three or more ploughings are generally given to the land intended for potatoes, yet in many cases, where the great object of loosening and cleaning the soil can be accomplished with less labour, one of them is dispensed with: and where the soil is clean and naturally loose, and the seasons favourable for harrowing, rolling, and couching, a great deal of the labour, otherwise necessary for the proper preparation of this crop, is rendered unnecessary.

*Sorts.*—There is perhaps a greater variety and a more frequent change of the different kinds of potatoes grown for the London market, than of any other vegetable. Almost every year a new sort is introduced, which is held out by interested sellers, or sanguine experimentalists, as quite free from the curl, as more abundant, or as of a better quality. It is, therefore, almost impossible to enumerate all the kinds which are grown: the gardeners and farmers possess between them no fewer than four kinds of kidney potatoe; the red-nose kidney, the white-nose kidney, the Spanish kidney, and the early kidney. There are besides, the ox-noble,

formerly

formerly raised almost exclusively for cattle, but now used for the table; the champion, the purple or American, and the cluster potatoe. The ox-noble is perhaps the kind that can be most depended upon in almost any kind of soil, but it is very late in ripening: the purple potatoe eats harsh and watery during the winter, but keeps better than the white kinds, and is very good in the spring, when *they* are beginning to spoil.

*Setts.*—The setts are cut and managed in Surrey in the customary manner. I did not hear that scooping out the eyes was practised. Those who are employed to cut the setts, are perhaps not sufficiently careful to select the deepest and strongest eyes, and to avoid such parts of the potatoe as have a number of small eyes nearly together. At least, the crop this autumn (1807), in many fields, had the appearance of this having been the case: the haulm was not branchy and strong, but on the contrary, upright, thin, and weak; and several shoots evidently had come from the root. The former circumstance might have arisen, in part at least, from the potatoes being planted too close: the latter could arise from no other cause but that pointed out above.

*Planting.*—When the ground has received the last ploughing and harrowing towards the end of March, it is generally time to commence putting in, at least, some sorts of potatoes: they are either drilled or dibbled in. In the former case, drills are drawn at the distance of thirty inches or three feet, and to the depth of seven or eight inches: the setts are then put in at the distance of twelve or sixteen inches: a thin covering of soil is then laid over them. When they are put in with the dibble (which is the more common way), the line which directs the dibbler is set across the ridges: the distance and depth at which they are dibbled, is the same as when they are planted. Where the ground is wet, it is commonly laid up into ten or twelve feet ridges, and water-furrowed.

The mode of practice followed by the gardeners in Surrey, in the culture of the early kinds, is thus described by Mr. Malcolm*.

"Among those gardeners who plant the early sorts for market, the custom is to prepare trenches in the same way as they are prepared for celery, under a south wall or pale fence, and parallel with it: in these trenches some good rotten or spit dung is put, on which a very slight covering of fine rich mould is placed, the sett (which is often the small potatoe entire) is planted at the distance of seven or eight inches, a small quantity of the same rich earth is put on the sett, just enough to cover it, over which some long dung or litter is placed five or six inches deep: as soon as the plants begin to grow, this dung or litter is gently raised up, a little more soil, and a little more fresh warm dung is added next to the roots; and in this way they proceed to add fresh soil, and dung or litter, as the plants advance, taking care that there is always a sufficient covering of litter to keep the frost from them. Some more curious gardeners, place cross breaks made of reeds, at about two rods asunder, in order to intercept the current of cold air and wind that too generally prevails at that season. Other gardeners, who raise them still more forward, grow them in hot-beds, and under frames, in the same manner as cucumbers and melons, where they soon become fit for use."

---

* Agriculture of Surrey, vol. ii. p. 456.

The quantity of seed necessary to plant an acre, must vary according to the sort, and the consequent distance at which they are put in: 12 bushels, at 60 lb. the bushel, if they are carefully and judiciously cut, are quite sufficient of the sorts that are planted 30 inches by 14.

*Horse and Hand Hoeing.*—Horse-hoeing is very seldom practised by the Surrey farmers, who trust entirely to hand-hoeing; indeed, until light instruments that can easily be drawn by one horse, are generally introduced, no drill crops can be horse-hoed. Hand-hoeing is bestowed on this crop, at least twice during their growth; but though this is done so as effectually to loosen the earth, and destroy the seed-weeds, yet it is of very little use in throwing the earth to a proper height round the potatoes. This autumn, many of the young potatoes, quite bare, and as green as the haulm, were lying on the surface of the ground. This is not the only bad consequence of not earthing up potatoes properly; the produce is not nearly so abundant, as when they have a sufficient quantity of loose and rich mould heaped upon and around them.

*Tops.*—These are frequently cut by the cow-keepers in the neighbourhood of London, and given to their cattle, when other food becomes dear or scarce: the haulm will sometimes grow again, so as to afford a second cutting. There was a curious instance this year, at Buckland, of a small patch of potatoes in a garden, which had flowered and been cut once, and were in flower, and ready to cut again in October. There seems every reason to believe, that the produce is diminished by cutting the haulm.

The curious and interesting fact, that the frost destroys the haulm of potatoes on low ground, much sooner in the year than it does that of potatoes grown on high land, was very evident this autumn: two or three very frosty mornings, about the middle of September, had browned and withered the haulm of almost all the potatoes on the low grounds of Surrey, while those on more elevated situations had very generally escaped. This circumstance has been accounted for thus: low flat land is more moist than elevated ground is; consequently, the evaporation is greater, and the heat to produce this evaporation must be drawn from the surrounding objects, and of course, by this means, they will be cooled, sometimes even down to the freezing point, on the same principle, and by the same means, as water in the East Indies is cooled. This explanation is objectionable as it stands, though probably, with some little modification, it would afford a satisfactory cause for this curious fact. The farmers in the hilly parts of Scotland are so sensible of the comparative safety of high situations, that they regularly plant their potatoes there, and take their seed-oats, without risk or apprehension, from such as have grown there, in preference to those that have grown on lower ground.

*Curl.*—This disease is very generally complained of in Surrey, as becoming more common and more inveterate every year. Many conjectures are formed here, as elsewhere, respecting its cause; but none of them are supported by observations or experiments sufficiently varied, extensive, or accurate. A circumstance may be mentioned which, though it will not point out the cause of the curl, may yet be of some importance, as ascertaining what accompanies the curl. In 1798, several potatoes were taken up, about a month after they had appeared above the ground; of these, some were very much curled, and others were entirely free from that disease. In every instance, the seed or sett of the curled haulm was found as sound, entire, and firm, as on the day it was planted; while, on the other hand, the whole of the seed of the sound haulm had gone towards its nourishment, except the mere skin, in most instances; and to a few haulms, a very small proportion of the seed in a pulpy state was still adhering. The Surrey farmers find no mode effectual to prevent the curl, but that of frequently changing the seed.

*Taking up.*—A three or four pronged fork is generally used, when they are taken up by the hand, which is by far the most common way: they are sometimes, however, taken up by the plough.

*Storing.*—Pits are used for this purpose, dug to the depth of about two feet in a dry soil: the potatoes are bedded with straw, laid at the bottom of the pit; and after being raised to a proper height in the form of the roof of a house, straw is laid carefully over them, and upon it, the earth that was dug out of the pit is pressed with the back of a spade closely and smoothly down.

*Produce.*—This varies greatly, according to the kinds planted: 300 bushels, at 60 lb. a bushel, or rather more than eight tons, are reckoned a good crop of the kidney potatoe. The champions, ox-noble, and cluster,

Digitized by Google

ter, will produce one-fourth more. The cottagers who raise them on a very small scale, and give them a deal of manure and labour, consider two bushels and a half or three bushels to the rood, as a fair crop: the former will give 400 bushels, or rather more than ten tons, and the latter 480 bushels, or nearly thirteen tons, per acre.

*Price.*—This also varies considerably; in a very dry or a very wet and cold year, they commonly fail to a great extent: last year (1806) they were selling at 6*d*. or 8*d*. a-peck, or at 5*s*. the sack (three bushels); this year they are 14*d*. the peck, so that now the price of the bushel is nearly what the price of the sack was in 1806: in that year, Mr. Pennington, of Lee Place, sold them on the ground at 1*s*. the bushel, and when taken up, at 20*d*. When sold by the acre, they vary from 12*l*. to 20*l*. The expense of carrying so bulky a crop to any considerable distance, not only confines their growth for sale, in a great measure, to the immediate neighbourhood of London, but renders the difference of price between two crops of equal goodness, very considerable, in proportion to their respective distance from the market.

*Application.*—Potatoes are not often grown in this county in any quantities, for any other purpose but to be sent to the London market. The coarser sorts, or the refuse of the better kinds, are given, either raw or boiled, mixed with chaff, to milch-cows, oxen, &c.

*Exhaust*, or *Improve?*—This is a question often agitated, and very difficult to determine, except by experiments accurately and carefully performed, and often

Digitized by Google

often repeated. The presumption is, that they exhaust the ground, or more properly, the manure applied to them. They may benefit the soil, or rather save the labour of the farmer, by keeping it open, and preventing the necessity of so many ploughings; but whence can the young potatoes draw the nourishment which supports and enlarges them, except from the soil? of course, they must leave it less rich, though more pulverized and open, than it was before the setts were planted. It would be almost supporting a contradiction to maintain, that the ground, after having borne a crop of potatoes, is as rich, and capable of yielding as good crops during the remainder of the rotation, as it would have been without the potatoes. If it can be shewn, that a series of crops, including potatoes, pay better than a similar series without the potatoes, from the same quantity of manure, the advantage of potatoes is sufficiently established; and on proper potatoe soils, there can be little doubt that this is the fact. Probably if the potatoes were not suffered to form their apples, the exhaustion of the soil would be much less.

*What succeeds?*—In general, wheat is sown after this root—sometimes oats or barley. Wheat certainly ought, if possible, to succeed potatoes, as the crop will not only be abundant, but the grain of a very fine quality.

---

The potatoe husbandry in the neighbourhood of London, is by no means well conducted. The methods that are followed in Dumfries-shire, and in the neighbourhood of Edinburgh and of Berwick, are perhaps best calculated for managing potatoe crops, on a large scale, on every variety of soil where they will grow with success.

In Dumfries-shire, and in general about Berwick, the land, after having been thoroughly reduced and cleaned, is laid up into one-bout ridges, drawn, if the field will admit of it, in a direction across that of the old ridges: into the hollows between these ridges, the dung is carefully spread; the potatoes are then set on the dung, and the ridges being split down by the plough, the potatoes are covered. Besides being hand-hoed carefully twice or thrice, a single-horse plough works among them, as long as can be done without injuring them, heaping the earth up as close and as high as possible on both sides of every ridge. The two great objects are, to keep them clean, and to give the young potatoes sufficient room to swell, by increasing the quantity of loose mould round the stem during their growth.

In the neighbourhood of Edinburgh, they are generally planted in a different manner: after the manure has been carefully spread on the land, it is ploughed with three ploughs following one another, and the potatoes are put into the furrow formed by the third plough; the rows are thus generally set about 30 inches from each other. As soon as the potatoes begin to appear, the ground is harrowed: the hand-hoe and single-horse plough are afterwards applied, in the same manner as in Dumfries-shire. They are always taken up by the plough.

The Dumfries-shire method is perhaps best adapted for a wet climate, or moist ground; the other method for a dry soil and climate: but they both are evidently superior to any method which does not admit of the single-horse plough being introduced. It has already been observed, and is indeed universally admitted, that a crop of potatoes can neither be good in quality nor abundant, unless they are carefully earthed up very often; and no hand-work can perform this, either so well or so cheaply as a single-horse plough. The advantage of earthing up potatoes with the plough, seems to be beginning to be perceived in Surrey; but it is yet so much neglected, as to justify the preceding remarks: besides, a single-horse plough upon a proper construction, with a mould-board that can be set to any width, is still wanting: it would perform the work much better, and far more cheaply, than any plough now used.

A practice may be here mentioned, which, though it cannot be adopted on a large scale, is worth the notice of the cottagers who cultivate potatoes in their gardens. It is well known, that there are potatoes of different growths and sizes at every root, especially in a moist summer: by taking them all up at one time, the small ones are in fact lost, or at least of no use but to be given to the hogs: to prevent this, let the mould be carefully removed from about the root of the potatoe, whenever there is reason to suppose some of them have attained a proper size; let such be taken out, and the mould be carefully replaced: this operation may be repeated, as often as there is reason to suppose any more of the potatoes have reached a proper size. By removing the large ones, the small ones have more room and nourishment, and will attain to a good size in regular succession; whereas by leaving them all in the ground till the root is dug up, a great proportion would have been small.

Digitized by Google

## SECT. XXI.—CLOVER.

### *RED CLOVER.*

Clover, as well as turnips, appears to have been cultivated in Surrey for at least a century*. They were both most probably introduced, or recommended to the farmers, by Sir Richard Weston, of Sutton, who, about the middle of the seventeenth century, published an account of the husbandry of Flanders, where these crops at that time formed a regular and constant part of the rotation. However this may be, the breadth of ground in the arable part of the Downs and on the northern clays, sown with clover, as far back as an old man of 82 could remember, was not greater (nor the crop better, in his opinion) than what is now cultivated. It probably was later of finding its way into the Weald: at present, it is cultivated there to nearly as great an extent as in the other parts of the county. In the common fields, as might be expected, it is not often grown.

*With what Crops sown.*—On all the land that is under the turnip husbandry, clover is generally sown with the barley that succeeds the turnips: if wheat or oats are grown after turnips, then the clover is sown with them—among the wheat in the spring, generally harrowed and rolled; or along with the oats, at the regular seed time for that grain. Mr. Birkbeck and Mr. Drewitt have sown it, with success, along with rape.

---

* From the following passage in Aubrey, clover appears to have been cultivated to a considerable extent at the time he wrote his History (about 1673). Speaking of Elsted, he says, "In this parish, and the parts adjoining, clover-grass has reduced the price of meadow-hay from 3l. to 1l. per load." Aubrey ascribes the introduction of clover to Sir Richard Weston, of Sutton, in this county, in 1645: he says, he brought it from Flanders or Brabant. It is probable, therefore, that Surrey was among the first, if not the very first district in England, into which this valuable grass was brought.

The crop with which clover ought to be sown, is probably not a matter of much moment, provided the ground has been well cleaned and pulverized. The objection to the sowing of it in the wheat, arises from the hardness of the surface of the ground, which has lain harrowed during the winter: this makes the regular planting of the young clover very hazardous on strong soils, even when they are harrowed and rolled after the clover is sown, and on all soils, if those operations are omitted. It has also been remarked that clover, and other grasses sown with wheat, do not keep the ground so long as when they are sown with barley; on which account, if it is intended that the land should lie more than one year in grass, the latter should be preferred.

*Seed.*—It seldom happens that more than 12 lb. of red clover are sown to the acre: if the seed is good and wholesome, and the land is in good condition, this quantity is amply sufficient. It is a very difficult operation to sow so very small a seed regularly: that it is very seldom properly distributed over the surface, is evident, from the unequal patchy appearance which the young clover generally has in the spring. In order to remedy this, Mr. Birkbeck has fallen on a method which answers the purpose effectually: if he intends to allow 12 lb. per acre, he at first gives the person employed to sow it, only 6 lb.; with this he goes up and down the ridge, or, in other words, he sows it with two casts, exactly as he would do, if it were all the seed intended to be given to each acre: when the 6 lb. are sown, the sower takes 6 lb. more, and repeats the operation in the very same manner he did before. The consequence is, that if there are plants, they are sure to be regularly distributed over the ground. This practice deserves to be imitated, and perhaps it might be extended with benefit to the sowing of all corn. Red clover is always sown alone, where it is intended for the London market: where it is not, it is sometimes sown with ray-grass, or trefoil—more commonly with the latter than the former.

*Time.*—If it is sown along with the oats or barley, the time, of course, depends upon their sowing: if it is sown along with wheat, the latter end of March is the most usual time.

*Top-Dressing.*—This is generally practised wherever soot, or the ashes of turf or peat, can be procured in sufficient quantity: of the former, from 25 to 30 bushels per acre are generally sown; of the latter, from eight to ten bushels. Gypsum has also been tried, but with doubtful advantage, at the rate of six or seven bushels per acre. The top-dressing ought to be given before winter, but it is often delayed till the beginning of spring*.

*Use.*—The greater part of the clover crops is made into hay. Within a short distance of London, much of it is cut green, and sold in bunches for horses and milch-cows. A certain proportion of every farmer's crop of clover is set apart for the use of his work-horses, which are fed with it in the stable. The second crop is generally fed off—sometimes, if it be very luxuriant, and the weather very favourable, made into hay; or when it happens to be very thin, or the farmer wishes to save his own seed, it is kept for that purpose.

---

* In the neighbourhood of London, coal-ashes are used as a top-dressing. Sometimes manure is spread on the young clover in the autumn, as soon as possible after the corn crop is off the ground.

The principal thing to be guarded against in making clover into hay, is, to preserve the leaves and flower: for this purpose, it should not be allowed to stand too long: there is less danger from mowing a day too soon, than from suffering it to stand a day too long; and supposing the first crop has been cut rather too early, any loss from that circumstance will be more than compensated from the superior quality of the hay, and the greater abundance of the second crop. The soil, too, probably receives more benefit, when the clover is not suffered to form its seeds, or, in other words, when the blossom is not suffered to begin to wither before it is cut. During the greater part of the process of the formation and the ripening of the seed, the other functions of the plant seem nearly suspended: neither the root nor the stem shoots out; and the ground, for a time, ceases to receive any benefit from the movement of the roots, and the shade of the foliage*.

Hay of a superior quality finds such a ready sale, and so very high a price, in the London market, that the sagacity and the care of the farmers near it have been roused to find out, and to go through, perhaps, the most perfect process of hay-making that is any where to be met with. There is so very little meadow-hay in Surrey, that the farmers there cannot vie with those of Middlesex in making it; but in their management of clover-hay, they are not behind them. The process, however, that is common in every essential point to Middlesex and Surrey, has been so well detailed by Mr. Middleton, in his Survey of the former county, that there appears no necessity for repeating it here. Clover is usually mown for about 1*s.* or 1*s.* 4*d.* per acre less than meadow-hay: this arises from the bottom being less matted, and (the ground having been rolled, and the stones gathered off in the spring) less uneven.

---

* See some excellent observations on the propriety of cutting the grasses more early than is generally done, in "Remarks on Live Stock, and relative Subjects," by Dr. Coventry.

*Produce.*—The produce varies considerably: one load per acre is reckoned a poor crop; three loads a great crop. A load and a half (27 cwt.) is much more common, except on the very rich or very poor lands, than either of the other quantities. When the second crop is made into hay, rather more than half the produce of the first cutting may be expected, if the weather is moist. A good second crop will produce of seed from four to five bushels, or between two and three hundred-weight per acre.

The Surrey farmers, as well as the farmers of other counties, are deterred from saving their clover-seed as frequently as they would otherwise do, in part at least, by the great expense and trouble of thrashing it clean. It cannot be thoroughly prepared for the market, or for sowing, under an expense of 5*s.* or 6*s.* per bushel. A machine which answers this purpose effectually, has been long known in Holland and Flanders. Of the manner in which it performs this operation, we may judge, in some measure, from the seed imported from those countries, and from the following description given of it by Mr. Bradley*.

"In Flanders, I have seen two or three ways of thrashing out clover-seeds by engines, after the heads of the seeds are thrashed out by common flails. The engine which I best remember, has a hopper at the upper end of a trough; so that the heads of the seeds fall constantly from the hopper into the trough. The said trough is about six feet long, and about two feet and a half over, and lies slopewise from the hopper, which is at the higher end, so as to drop at the other end about a foot. The bottom of this trough, withinside, is made rough by chisels; and upon it is a board, made to draw backwards and forwards, which is cut in a rough manner, like the inside of the bottom of the trough. When the seeds fall into the trough at the upper end, the broad board in its motion draws them through the trough, and thereby breaks or opens the seed-vessels, so that the chaff and the seed run out of the lower end, ready for winnowing. This motion is maintained by a water-wheel and a crank, and answers very well the purpose it is designed for. I have seen an engine of this kind, where the bottom of the trough was a hurdle, more finely wrought than our common hurdles; and the sliding part, which I call the broad board, was an hurdle of the same make. In this I found, that most of the pure seed fell through the lower hurdle, and little more than chaff was discharged by the lower end of the trough, and consequently, must give less trouble in the winnowing, or cleaning from the chaff. There is commonly a weight laid upon the upper hurdle or board, the better to break the heads of seeds that pass between that and the bottom of the trough *."

---

* Bradley on Husbandry and Gardening, vol. ii. p. 39.

### *WHITE CLOVER,*

Is sometimes sown, but very seldom, along with the red. It generally forms part of the seeds with which land is *laid down;* but as it is by no means a common practice in Surrey to lay down lands to permanent grass, and as this subject will come more properly to be treated hereafter, the particulars relating to the quantity, &c. of white clover will then be detailed.

*Is the Land tired of Clover?*—Several very observant and experienced Surrey farmers complain, that the land is tired of clover, or rather, that it is more difficult to raise good crops of it now than it was formerly. Pease or beans are sown, in order to vary the rotation, where the land is found to be *tired* of clover. So far as the object is merely to vary the course, these crops answer the purpose; but I did not hear of any annual crop for the support of horses, cattle, &c. that had been introduced, that at all supplied the place of clover. A succession of tares, obtained by sowing them at different times through the winter and spring, might perhaps answer, in some degree, the purpose of the clover crop.

---

* Aubrey, in his History of Surrey, under the parish of Warplesdon, says, "They have an art here, not commonly known, of cleansing the seed of sainfoin and clover."

### TREFOIL.

It is a very common practice, to sow a few pounds of trefoil among the crop that immediately precedes the turnip or summer-fallow: by this means, at a very trifling expense, some good sheep-feed is obtained for the beginning of winter. There can be no objection to this practice, unless where the land is very foul, and the temptation of food for the sheep, prevents the farmer from ploughing his stubble up as soon as he ought. The practice of sowing trefoil in this manner, appears to have existed very long in this county. It is stated (I think in Magna Britannia, edition 1727), that Sir Richard Weston, of Sutton, introduced this grass into Surrey*. A few pounds of it are sometimes sown along with the red clover.

### RAY-GRASS.

This is not very often sown in Surrey, even with clover, and seldom, I believe, by itself. Mr. Birkbeck sows it, along with trefoil, in his rape for his sheep. The small quantity of ray-grass sown in Surrey, does not arise so much from any objection to the grass itself, as from the hay made of it, either by itself or mixed with clover, not selling nearly so well, nor at so high a price, as unmixed clover-hay. As the clover crop, also, is valued as an excellent preparation for wheat, and is found to answer this purpose best when it is quite pure, ray-grass is excluded whenever wheat is to follow, which may be said to be the case almost universally on the turnip soils, and very generally on the northern clays. In this the Surrey farmers act wisely, for certainly in determining on the crops to be sown, not only the positive but the relative value of each crop should be taken into the account: it should be considered relatively to the crop or crops that are to follow it.

---

* Aubrey mentions the date of the introduction of nonsuch (or trefoil) in the following passage, but does not ascribe its introduction to Sir Richard Weston: "Here (in Warplesdon) is excellent grass, called nonsuch, which has a greater bennet or bent, and is equal to sainfoin, and has been cultivated in these parts not above 30 years."

## SECT. XXII.—SAINFOIN.

THIS plant is cultivated to a very considerable extent in Surrey; the management of it is in general well understood, the produce it affords is great, and the merits of it are duly prized. Its culture is upon the increase; and probably, if such a large proportion of the chalky hills were not continued under the natural herbage, the Downs would be entirely covered with it. As it is, extensive fields of it may be seen the whole breadth of the county, from the borders of Kent, at the eastern side, to the borders of Hampshire, on the western, near Farnham, covering with its valuable herbage large tracts of the chalky ridge*.

I. *Soil.*—From the experience of this, as well as of the other counties in England, where sainfoin is grown, the great advantage, if not the absolute necessity of a calcareous soil for this plant, is thoroughly and universally acknowledged. Provided the subsoil be lime or chalk, of a loose and soft texture, it is not of so much importance what the upper soil is. On the range of hills where it is grown, the upper soil varies considerably: some of it is a thin, tough clay, some a rich loam, and some of a poor sandy nature. It is the common opinion, that the soil should not be too rich; this opinion is probably correct in one sense, but not well founded in another; and as it may lead to mistaken and hurtful practice, it may be well to state in what construction it is accurate and well founded. If sainfoin is sown on a soil rich with manure, it is probable that the crop will not be valuable, since a soil highly manured has a tendency to make the sainfoin strong and coarse: but there is little danger of this consequence resulting from a soil naturally good; *i. e.* from a deep, sound, hazel loam. This crop, like all other crops, will always be good in proportion to the natural richness of the soil, though like other crops, it may be injured by the soil being rendered artificially too rich. A retentive, strong, clay soil, even though it lie on a calcareous base, is less favourable to sainfoin than a light, poorish soil on the same base: on the former soil it is apt to rot, if the winter prove severe and wet alternately.

---

* The date of the introduction of this very valuable plant into Surrey, I cannot exactly ascertain, but from a passage quoted from Aubrey (in a note on the article Trefoil), it appears to have been well known in his time (1673).

I met with but one instance of sainfoin on a soil and subsoil, not calcareous: this was on the farm of Mr. Pennington, of Lee Place, near Godstone. The soil was a good sandy loam, on a subsoil of gravel: the sainfoin looked healthy, covered the ground well, and had every appearance of continuing several years. I did not understand that the ground had been chalked or limed; but from the vicinity of the farm to the chalk,

Digitized by Google

chalk-hills, it is by no means improbable that chalk had been used over the whole of it.

Where the sainfoin is sown on a soil with a chalky base, the roots will reach that base, at however great a depth it lies: at least, the roots of it were found several yards below the surface, in forming the road between Croydon and Godstone. A calcareous rubble, through which the roots can easily and speedily penetrate, is found to be very favourable to this crop.

On the whole, wherever there is a calcareous subsoil, however poor, or of whatever nature the upper soil may be, a farmer may sow sainfoin with every prospect of gaining a valuable crop for eight or ten years, with little trouble and scarcely any expense.

II. *Manure.*—As sainfoin is generally sown with barley after turnips fed off, and as any extraordinary quantity is, as has already been observed, unfavourable to the quality of the hay, no direct and immediate application of manure is given to it.

III. *Tillage.*—The only difference of the tillage given to the barley crop when sainfoin is to be sown instead of clover, is that some farmers plough the land thrice, and at the second ploughing go beyond the usual depth. The two great objects to be had in view in the preparation of the ground for this crop, are to open the soil to a considerable depth, especially if it be rather strong, and to reduce it to a fine and even mould.

IV. *Seed.*—The usual quantity of seed per acre is four bushels, but as the quality and consequently the value of the hay is in direct proportion to the fineness of the stalk, it is better to give an allowance of five bushels per acre. This is the allowance of some farmers who produce hay equal, if not superior in quality, to any brought from Surrey to the London market.

There is considerable difference of opinion respecting the propriety and advantage of sowing trefoil with sainfoin: this used formerly to be the general practice, but some of the most successful growers of sainfoin are decidedly averse to it. By those who sow trefoil along with sainfoin, it is urged in defence of the measure, that sainfoin produces a very scanty crop the first year; and that if sown by itself, not only will the hay be of little bulk, but the other grasses, particularly couch and oat-grass, will get up among the sainfoin: whereas, they alledge, by sowing trefoil along with it, a full crop is got the first year, and the ground being completely occupied, the weeds cannot arise to spoil the sainfoin, and choak it during the subsequent years.

On the other hand, those who sow sainfoin by itself, maintain that one cause why the sainfoin plants are thin the first year, arises from their growth being impeded by the trefoil: that if no trefoil were sown, a crop of hay, perhaps less bulky, but certainly more valuable, would be got the first year, while during the subsequent years, the sainfoin would be more close and fine than when it has to cover the ground formerly occupied by the trefoil, which it can do by no other method than by throwing out shoots from the thinly scattered plants. With regard to the necessity of sowing trefoil in order to keep down the weeds, the reply is obvious: ground on which sainfoin is to be grown, ought more carefully than any other ground, to be made previously clean: if it be foul in the smallest degree with root-weeds, it is not in a proper condition for this plant.

The scantiness of the first year's crop of sainfoin, will on examination, probably be found to arise, not from the want of plants, but from some of the plants not being arrived to such a height as the others. If this be the state of the case, it is plain, that by sowing trefoil, some of the plants of sainfoin must be destroyed or greatly weakened, if the trefoil thrives; and if it does not, it is of no use to sow it. If it should be found, that the thinness of the first year's crop of sainfoin hay arises from the thinness of the plants, and from their not branching out till the second year, this circumstance, which is injurious to the crop not only the first year, but in every subsequent year, by rendering the hay coarse and strong, might easily be remedied by allowing more seed.

On the whole, both from general reasoning and from the experience of several farmers, it appears fair to conclude, that the practice of sowing trefoil along with sainfoin, is useless, in so far as the proportion of hay gained by the mixture of trefoil, does no more than make up in value for the greater quantity of pure sainfoin hay which would be got if no trefoil had been sown; and that it is prejudicial, in so far as it has a tendency to injure the fineness of the sainfoin hay during the remainder of its growth.

The following circumstance decidedly proves the impropriety, or at least the inutility of sowing trefoil along with sainfoin. Mr. Birkbeck, of Wanborough, who cultivates sainfoin on a very extensive scale, had been always in the habit of sowing a certain proportion of trefoil along with it; but one year his servant, by mistake, omitted to sow the trefoil on a certain part of a field. The sainfoin on this part flourished much better, and reached to a greater perfection of growth and greater fulness of crop, than the sainfoin that was sown along with trefoil: hence Mr. Birkbeck justly concluded, that the latter might at least be considered as useless, if not as absolutely prejudicial, and therefore for the future he resolved to sow his sainfoin by itself.

V. *Time.*—Sainfoin has been sown both in autumn and in spring: the result of the experiments is, that when sown rather early in spring, it is found to answer best. The latter end of the month of March, or the beginning of April; or in other words, the most advantageous time for sowing barley, is also the most advantageous time for sowing sainfoin.

It is sown with barley much in the same manner as clover is; *i. e.* after the barley has been harrowed once or twice, the sainfoin is sown, and the ground again lightly harrowed and rolled. As the seeds penetrate through the ground with some difficulty, it is of consequence not to bury it deep, and at the same time to make the ground fine and even.

VI. *Drilling.*—This is scarcely ever, if at all, practised in Surrey, though there are some advocates for it. The advantages of drilling, setting aside for the present the opportunity it affords of cleaning the ground, and considering it solely in reference to its effect on the plant itself, are evidently greater, where grain or seed, than where herbage is in question; and where, as in the case of sainfoin, the value of the hay depends in a considerable degree upon its being fine, there seems every reason to suppose that drilling would be actually injurious.

There can be little doubt, that if sainfoin were sown on a proper soil, in rows at the distance of two or three feet; and if these intervals were regularly hoed and kept clean, the sainfoin would soon cover the ground as completely as if it had been sown broad-cast: but it is equally plain, that if the ground was covered from a comparatively small number of plants, the shoots or branches must be thick and strong, and the hay coarse. While, therefore, the price of sainfoin hay depends in a great degree upon its being fine, it is evidently improper to cultivate it in that manner which will effectually prevent it from meeting the demand of the market, unless indeed, the benefit to the ground from this mode, more than compensates for the loss sustained by the inferior quality of the hay. This however is not the case; since, if the land be well prepared, and the sainfoin sown thick, the ground will be kept as clean as if the crop had been drilled, at least till it begins to decay.

Where the object of cultivating sainfoin is to cut it green, the drilling of it is not so improper, though even then it is probable that it will be better relished by horses and cattle, as well as more nourishing, in proportion to the fineness and succulency of the herbage. When seed is the only object of growing it, the drilling of it is peculiarly proper. Like the bean, the most perfect and valuable part of the seed, as being that which fills and ripens soonest, is towards the bottom, both of the centre and lateral shoots; it is therefore of great consequence, that the air and sun should have free and equal admission to every part of the plant;

and this can be effected best and most certainly by drilling.

VII. *Management.*—Upon the deep hazel loams that lie along the north edge of the chalk-hills between Croydon and Epsom, the sainfoin seldom receives any particular attention, or any manure or top-dressing. But on the thinner and colder soils, it is found advisable to apply a top-dressing to it, in some cases every year, and in other cases, once in two years.

It is a pretty general, and seems a well-founded opinion, that if top-dressings be applied where the soil is naturally deep and rich, especially if the top-dressings consist of strong manure, and be often given, not only will the sainfoin become coarse and strong, but it will wear out much sooner than it would otherwise have done.

Where the soil actually requires some top-dressing, the most approved and common is ashes of coal, turf, or peat: coal-ashes are considered the least likely to do harm, as having less tendency to wear out the plants, than ashes of turf, or peat, or than soot. In short, the general rule to be observed in dressing sainfoin, is nearly the reverse of that which directs the application of manure to other plants. On most soils, no top-dressing is necessary; and on all soils except the poorest, the top-dressing can scarcely be too light. It is a curious, and perhaps a singular instance, of a plant regularly cut every year, not requiring, or rather rejecting the assistance of manure. On cold, strong soils, coal-ashes are considered advantageous, not merely as a manure, but as tending to open the soil, and to render it less hurtful to the plant. The common allowance

Digitized by Google

ance per acre, is 30 bushels every two years. Gypsum has been used as a top-dressing with success, at the rate of five bushels to the acre. Mr. Pennington has used rabbits'-waste with great advantage.

VIII. *Application.*—By far the greatest portion of the sainfoin in Surrey is made into hay—some is kept for seed: the after-grass is given to young cattle or horses, seldom to sheep.

1. *Hay.*—As soon as ever the sainfoin is in full bloom, it is the proper season to cut it for hay: this is in general done with scythes, with cradles or bows on them. It is suffered to lie in the swaths till it is nearly dried through, when it is carefully and regularly turned over with the handles of the rakes, or with large wooden forks. If the weather prove favourable, it may then be put up in cocks, and carried the day after the swaths were turned. Great care must be taken not to *over-make* it. The perfection of sainfoin-hay is, when the blossom retains its natural bloom and figure, and when the stalks and leaves are of a clear and healthy green. It is easily spoilt by wet weather; as not only the richness and fragrance of the hay are thus injured, but from the porous nature of the stalks, it is difficult to dry it thoroughly when it once is wet. The price of mowing it is the same as for clover. The quantity of hay is from one ton to two tons and a half per acre. In general it may be reckoned, that a greater weight of hay per acre will be got of it, than of clover on thin chalky soils, and the hay is of superior quality and value. It may be used from the stack, in three or four days after it is put up, if the crop is not very bulky. The best time for carrying it to market is before Christmas;

Digitized by Google

mas; both the quality and the price are then above what they will in general be, if it be kept till after the new year.

Very few of the Surrey farmers, who are within 18 or 20 miles of London, consume their sainfoin-hay at home: those at a greater distance give it to their horses principally, and to their milch-cows and cattle. It is in a very high degree grateful and nourishing to all kinds of stock. In London, the hay always brings a better price than clover-hay.

2. *Seed.*—The management of sainfoin, when the seed is the principal object, is rather difficult. In the first place, the pods, as has been already remarked, fill, and the seeds ripen, at different times, according as they are placed at the bottom or top of the stalks; of course, it is almost impossible to hit the season when all the seeds are in a proper state of ripeness: and in the second place, the seed very easily falls out, if it meet with rain, or if it be roughly handled during the making.

When the husks are of a brownish colour, and the seeds feel plump and firm, it is then time to mow it: this is done by the most careful Surrey farmers, only when the dew is on the plants, or at least, not when the weather is either very windy or very dry, since the seeds are very apt to fall out, if the pod is parched by the sun, or the stalk shaken by the wind. The swaths are not turned, for the same reason, if they can be got sufficiently dry without it: when it is necessary to turn them, it is done as gently and carefully as possible, by putting the handle of the fork or rake below that part which contains least seed, while the bottom of the stalk, where the greatest quantity of seed is, rests on the ground, and is turned without being lifted from it. In a good year, and when proper care is taken to prevent the seed from falling out, four quarters per acre may be looked for.

3. *After-grass.*—This is principally given to cattle and horses: sheep are seldom allowed to taste it, since it is alledged, they will eat the roots bare, and thus expose them to the frost. Some farmers, however, put sheep on their sainfoin, both in the autumn and in the spring, taking particular care that they do not eat it down too close. Sheep are remarkably fond of it, and it is surprising at what a distance they will discover, either by the eye or the smell, a field of it, and what circumspection both of the shepherd and his dog it requires, to keep them from it. It is considered best, not to admit either cattle or sheep upon it till the frost has touched it, or at least till it has given over growing.

IX. *Duration.*—This seldom exceeds eight or ten years; at least, when it has stood so long, the broad or oat grass begins to smother it; and of course, not only does the crop become of comparatively little value, but if it is suffered to continue much longer, the ground gets very foul. This oat-grass is the greatest enemy sainfoin has: on the best soils, and under the best management, it will creep in among it, after it has continued eight or ten years; and on poorer soils, *i. e.* soils naturally not so well calculated for sainfoin, or on soils not previously well cleaned, I observed a thick crop of oat-grass, with a few straggling plants of sainfoin, even where the latter had not been sown above three or four years.

X. *How broken up.*—In general, it is ploughed up, and a crop of pease or oats is taken after it. Mr. Birkbeck, of Wanborough, however, uniformly pares and burns his old sainfoin-ley, after which he usually takes a crop of turnips, though in some instances he takes wheat. From the great quantity of root which the sainfoin possesses, as well as from the oat-grass which gets possession of the ground, before it is judged expedient to break up the sainfoin, the practice of paring and burning seems well adapted both to reduce the remains of the sainfoin to manure speedily and effectually, and to clear the ground of the roots of the oat-grass. This mode Mr. Birkbeck finds an excellent preparation for turnips.

XI. *How soon renewed?*—The common opinion is, that sainfoin will not bear to be repeated on the same ground, till at least 15 or 20 years have elapsed: I did not understand that this opinion was taken up from experience. Some, perhaps, of the Surrey farmers have been deterred from sowing sainfoin again on the same ground, by this notion, even when they had no other part of their land fit for it; but as most of those who cultivate sainfoin, have a large proportion of calcareous soil, they are under no necessity of hazarding the experiment. There is, however, one instance of sainfoin having been almost immediately repeated on the same ground. Mr. Currie, of East Horsley, took up a piece of sainfoin-ley which was 20 years old: he first sowed pease; he then fallowed the ground, and laid it down again with sainfoin, sown along with a crop of oats. The new sainfoin looks and thrives as well, as if it had been sown on ground never before under that plant.

Indeed,

Digitized by Google

Indeed, if we reflect, we shall be strongly inclined to suspect, that the prevalent idea is unfounded. There can be no doubt that the peculiar nourishment of sainfoin is calcareous matter, or at least, that this is absolutely necessary to it. From this we might conclude, that if the calcareous matter had been exhausted during the first crop, it would be useless to sow a second; but in the soils where sainfoin is sown, both in Surrey and in other counties, the calcareous matter is absolutely inexhaustible. If sainfoin required a soil very rich and full of manure, or a soil of any other peculiar character but that of being calcareous, the result would probably be, as now supposed, that the continuance of it in the ground for eight or ten years, had completely worn out the peculiar food of the plant; but as the case stands, it is highly probable that sainfoin might be renewed on the same land, after a few intervening crops, and a proper quantity of manure.

## SECT. XXIII.—LUCERN.

THIS plant is not sown to any great extent in Surrey, a few farmers only having perhaps four or five acres of it. The soil chosen for it is a deep rich loam; but tolerably good crops have been got by Mr. Adam, of Mount Nod, near Streatham, on strong moist loam.

It is generally sown in drills, though some farmers prefer the broad-cast method. As the great object in having a few acres of lucern is, to cut it frequently green during the summer, perhaps the drilling of it, and working between the drills with a horse-hoe, is the most proper management, as thus the growth will be quickened, while, by its not being suffered to stand till the stalks become hard and thick, no objection can arise from the thinness of it on the ground when sown in drills.

The ground is prepared for this crop with as much care, and generally much in the same manner, as for sainfoin: when sown broad-cast, it is put in along with barley or oats; when drilled, it is generally put in by itself. From 14 lb. to 16 lb. of seed is the allowance when broad-cast—about half that quantity when drilled. March and April are the usual months for sowing it.

It is absolutely necessary, both to put lucern on perfectly clean ground, and to keep the ground clean while it is growing: perhaps few plants are more injured by weeds than it is.

In very favourable years, it may be cut green four or five times, while it continues in perfection; but towards the end of the sixth or seventh year, it is apt to leave the ground, and to be choked with weeds. From the condition of the drilled lucern I saw in Surrey, the farmers there seem to lose the principal advantage of drilling in the management of it, as well as in the management of their other drilled crops: they either do not draw their drills at a sufficient distance to admit the horse-hoe, or they do not use it, if the drills are wide enough: hence weeds fill up the vacancies left between the drills, and this want of attention had choked with weeds most of the lucern I saw.

It is sometimes, but very seldom, made into hay; indeed this method seems losing one of the principal advantages of lucern, since a crop which can be cut green four or five times, and which affords a very nourishing and grateful food to all kinds of farm stock, is almost thrown away when made into hay. The usual duration of lucern, on dry clean soils, is for seven or eight years.

## SECT. XXIV.—HOPS.

It is impossible to ascertain with exactness and certainty, the time when the culture of hops was first introduced into the parish of Farnham and its neighbourhood, or the circumstances that gave rise to its introduction. It is highly probable that they had been cultivated to a considerable extent, and for some length of time, in most of the other districts where they are now grown, before they found their way into this corner of Surrey. This opinion is supported by many concurring circumstances: the hop, as well as clover and turnips, was brought into this country from Flanders, and there is every presumptive as well as direct evidence, that it was first cultivated in the counties on the East Coast, and that it found its way gradually to the more interior or western parts of the kingdom. In the next place, Farnham was formerly remarkable for its cloth manufactory; and while it continued, it is known that the culture of hops, though it may have been introduced, was not carried on to any considerable extent. As the manufacture of cloth declined, and receded from Farnham to some of the neighbouring towns, the culture of hops advanced and took its place.

It is not easy to determine, when this change in the occupation of the people of Farnham took place: if we may credit tradition, confirmed by several corroborating circumstances, it was about the middle, or rather towards the end, of the seventeenth century. It is also difficult to ascertain, whether the culture of hops was introduced and encouraged, in *consequence* of the decline of the cloth manufacture; or whether the latter owed its decline to the introduction of the culture of hops. The former is certainly a more probable supposition than the latter; since, we believe, it will seldom be found, that while one branch of employment is vigorous and flourishing, another can be introduced sufficiently popular and powerful to root the former out. Perhaps the fact was, that on the decline of the cloth manufacture, from causes which cannot now be even conjectured, those who had been engaged in it, naturally looked for some other mode of employing their time and capital, and that the culture of hops was thus introduced. How that particular object came to attract their attention, cannot now be satisfactorily explained: the current and common tradition about Farnham is, that the hop was first brought from Suffolk by one of the cloth manufacturers; and that his success in the culture of it, induced others to attend to it, to the neglect and ultimate ruin of their former trade. The latter part of this tradition we have already rejected, as not consistent with what we know of the stability and permanency of any particular trade or manufactory, while it *continues to flourish*: its death, as we have already observed, might have been *accelerated*, but could hardly have been entirely occasioned by the introduction of the hop culture. With respect to that part of the tradition which traces the Farnham hop culture to Suffolk, there is nothing improbable in

it.

Digitized by Google

it*. To finish this conjectural history: it is well known, that we imported a very considerable quantity of hops during the greater part of the seventeenth century, and that much fraud was practised in the packing of the foreign hops: it is very probable, that the encouragement given to our own culture of hops, in consequence of this and the decline of the cloth manufacture, extended the growth at Farnham, after they had been introduced from Suffolk.

It would be another curious and interesting subject, to ascertain, if possible, how long the Farnham hops have borne their high character and price; at what period they became so famous; and to what circumstance they were first indebted for that peculiar mode of management, by which they command a price so very superior to that given for the hops of other districts. On this point, however, I could learn no facts or circumstances, which would lead even to a probable or distant conjecture.

From every inquiry I made, I found that the extent of ground cultivated with hops was annually increasing in Farnham and the neighbouring parishes. Within these last 100 years, the number of acres is nearly trebled: at the beginning of the last century, there were not more than 300 acres in the parish of Farnham; now there are between 800 and 900 acres; and this year (1807), there is a greater demand for plants than there was last year. This is a pretty decisive proof that the

---

* Besides the traditional opinion respecting the place from whence the hop culture was brought to Farnham, we have the direct authority of Aubrey, in his History of Surrey, which was drawn up in 1673: his words are, " Old Mr. Bignell's father was the first that planted hops here, which husbandry he brought out of Suffolk 76 years since." This fixes the date of their introduction at the end of the sixteenth century.

Farnham hops, notwithstanding the great expense attending their cultivation, and the enormous rent of the ground on which they grow, pay the growers very well.

Hops are grown in many different parts of the county of Surrey besides Farnham, and its immediate neighbourhood; but every where else, I believe, they are grown by farmers: at Farnham, in general, the hop culture is either the sole, or the principal object and dependence of the grower. As the following detail refers exclusively to the culture and management of the Farnham district, it may be proper, before we enter upon it, to mention the other parishes in which hops are grown as part of the farm products, and their general mode of management, in order that there may be no interruption or confusion in the principal object of this Section—"The Farnham Hop Culture."

A few acres of hop-grounds are to be met with in the parishes of Chobham, Bagshot, Effingham, Oxted, Tanridge, Godstone, Lingfield, Horne, Horley, &c.: in short, wherever there is a piece of deep rich ground, lying low, but not wet, and well sheltered, there is generally a small extent of hops. I was most surprised to find, that they had been tried with great success, for the first time this year, very near to the town of Bagshot, close to the heath: the crop had been much better than that which was grown on the richer lands, owing probably, in some degree, to the great care and great quantity of manure bestowed upon them as a *new cròp*, and partly to the circumstance of their being young and vigorous plants.

The management of such hop-grounds as are very small in extent, and at the same time a mere appendage to the farm, differs from that of the Farnham district, princi-

Digitized by Google

principally in the substitution of the plough or nidget for hand-labour: one remark may be made on them, the truth of which is liable to very few exceptions: either the hop-ground or the farm is neglected. Indeed, from the very great attention which hops require, and the immense loads of dung which they demand, or at least receive, it would appear to be for the advantage both of the public and of the hop-grower, that no other object should engage his attention or divide his capital.

*Soil.*—That hops will grow and thrive in very different kinds of soil, is evident from the great variety on which they are planted with success in different counties. But in ascertaining what kind of soil is the most proper and favourable for this delicate plant, several things are to be taken into account: in the first place, it is well ascertained by the hop-growers in Farnham, as well as in other places, that the quality of the hop varies with the soil: in the second place, the quantity produced varies, and the certainty of a good crop is greater on some kinds of soil (taking a number of years together) than on others; in the third place, the duration of the hop is much greater on some soils than on others: the soil on which the best quality, the largest quantity, the greatest certainty of a crop, and the longest duration, may reasonably be hoped for, *is a rich loam, of a hazel-colour, rather strong, dry, friable, very deep, lying on a calcareous or marly subsoil.*

On soils which are very strong, and inclined to be wet, and which lie on any other subsoil but chalk or marl, large crops of hops may be got: but they are precarious, not so fine in quality, and the plants are comparatively of very short duration. Although, however, the hop appears to require a calcareous subsoil, yet it is absolutely necessary that even this subsoil should lie at a very considerable depth below the loam. This, indeed, might naturally be expected from the length of the roots of the hop: they have been found on very rich deep loam, in the neighbourhood of Farnham, to the depth of twenty feet. There are hop plantations there, on such soil, which have existed beyond the memory of the oldest inhabitant: there is even no tradition when they were first planted. On the other hand, such plantations as occupy a shallower or less kindly soil, have been planted and grubbed up within the memory of many of the inhabitants.

There are several hop plantations near Farnham very flourishing, and of long duration, which appear to contradict the opinion, that hops will not continue very long, except on soils with a calcareous base; since to common observation they appear not to lie on chalk; but though it may be difficult to prove without much labour, that any particular plantation is incumbent on a calcareous subsoil, yet the general nature of the surrounding country, and the kind of stones that are found, justify the conclusion, that chalk either forms the subsoil, or is intimately mixed with the soil itself. The immediate neighbourhood of the chalk-hills, and the great quantities of that particular kind of flint which accompanies chalk, render it very improbable that the adjoining soil should be free from chalk. Besides, the acknowledged and well known fact, that hop-plantations thrive best, and continue longest, on soils which are known to lie on chalk or marl (as it is sometimes called about Farnham), affords the strongest reason to believe, that wherever they are found to prosper extremely well, and to continue very long in the ground, there is either a calcareous subsoil, or a considerable mixture of chalk or marl in the upper soil, though it may not be easily distinguishable.

The only fact I heard urged by the hop-growers at Farnham against this doctrine, has already been noticed; viz. that hops would not thrive well near the chalk: this evidently proceeds upon a misconception of the question; since it does not prove that a chalky subsoil is unnecessary or injurious, but merely that chalk near the surface, or in other words, that a shallow soil, is unfavourable for the culture of hops.

The result of the observations and enquiries of Mr. Marshall, is so much in favour of what I have advanced, that I cannot help laying it before my readers.

"From the whole of the information collected in this part of Kent (the district of Maidstone), it is evident, that to unite the three desirable properties belonging to the produce of a hop-ground, namely, *quantity*, *quality*, and *duration*, not only a DEEP RICH SOIL, but an ABSORBENT CALCAREOUS BASE, are essential." —(*Southern Counties*, i. 186).

"DURATION of hop-grounds. This depends wholly on the nature of the land: and chiefly, if not entirely, on its *substrata*. From every observation I made in West Kent, and from the whole of the evidence I collected in it, hops require not only an ABSORBENT, but a CALCAREOUS BASE, to render them durable. The soil itself may be improved; and there are instances in which soils of the lowest quality, for ordinary cultivation, have afforded full burdens of hops. But no art has yet been discovered to induce lands with non-calcareous

Digitized by Google

calcareous subsoils, to endure in this crop. Even the rich silts of the Tunbridge quarter, though incumbent on absorbent bases, seldom throw up more than ten or twelve profitable crops. On the stronger lands of the Weald, which have firmer bases, their duration is nearly the same. While on the strong rich loams of the Maidstone quarter, which rest on rock and calcareous rubble, they may be deemed PERPETUAL. There are grounds of which no man now living can remember the first planting."—*(Idem.* p. 286).

" On the south side of the Valley, opposite to Farnham, in the parish of Wrecklesham, the hop-grounds are scattered among arable and grass lands, the base of the soil being, on that side, a flinty gravel on sand; while the chalky hills of Farnham are wholly hop-grounds, and some of them old beyond memory. This is a further evidence that hops are partial to a CALCAREOUS BASE.—(Vol. ii. p. 49).

*Rent.*—This varies considerably: the nature of the soil, of course, principally determines the price given per acre: this, however, is not the only cause of the variation: many of the smaller hop-plantations are taken by persons who trust principally to their own labour to cultivate them: these persons can afford to give a higher rent, not so much perhaps by their working themselves, as by their being content with less profit than those who hire labourers.

The rent of hop-grounds, like every thing else, has increased greatly within these few years: Mr. Marshall informs us, that in 1791, 10*l*. an acre was not considered as an extravagant price for grounds of a good growth: in 1802, the rent varied from 4*l*. to 10*l*. 10*s*. per acre; the average was then reckoned to be about 6*l*. At present (1807), the inferior land, as it is deemed, letts for 6*l*. 8*l*. 10*l*. per acre: good land for 12*l*. 14*l*.: one plantation letts for sixteen guineas per acre, and some of the very best land is reckoned worth 20*l*. per acre. Where the rent varies so very much, it is extremely difficult to name the average: I was informed by a person in Farnham, who has long been thoroughly conversant in every thing relating to the rent and management of the hop-grounds there, that the average rent was at this time 8*l*. per acre: this I should however, be inclined to consider as rated too low.

The great excess of the rent of the Farnham hop-plantations above those of every other district, is what strikes a person first and principally, when he contrasts the different hop-districts in the kingdom. The cause of this must resolve itself into the cause of the high price of the Farnham hops: this will be investigated afterwards: at present it will be only necessary to take notice of a very curious mode of reasoning adopted by some, who endeavour to account for the high price of the Farnham hops.

They contend that the price of these hops is the *consequence* of the high rent given for hop-ground about Farnham. There can be no doubt that the price given for any article must defray all the expenses attending the production or manufacture of that article; but no person can expect to get a superior price, merely because he has been at greater expense or trouble, unless his greater expense or trouble produce a better article. If hops could not be grown any where but at Farnham, and there only at the expense at present attending them, and if at the same time the demand continued undiminished, then the price would be the necessary consequence of the expense; or more properly speaking, the price would then always be as high as at least to cover the average expense: but while other hops can be grown at less expense than those at Farnham, the latter would never rise in price above the average expense of the lowest districts, unless the demand increased for hops in general, or the quality of the Farnham hops was found or considered to be superior to that of other districts: in the former case, the rise would extend to all hops: in the latter, it would of course be confined to the Farnham hops. This opinion has been examined, rather because it is pretty common, than because it is solid or even plausible.

*Exposition.*—The hop, like all other delicate plants, is particularly liable to be injured by the winds from the north, north-east, and east: these winds, particularly the north-east and east, are not only prejudicial to the hops, especially during the spring months, by the rawness and coldness which usually attend them, but they are also supposed by the Farnham hop-planters to bring the "long-winged fly" and its *aphis* along with them. In order to secure the hops as much as possible, a south exposure is always preferred, where it can be had; and hedges are planted on those sides from which the most destructive winds blow.

The great demand for hop-plantations, and the consequent increased extent of ground under hops, has however, obliged them to be planted without much regard to exposure in many instances: and the open field in which many even of the oldest hop-plantations lie, of course makes the shelter not so common as it otherwise would, and certainly ought to be.

*Prepa-*

Digitized by Google

*Preparation.*—There are three different modes in which the ground is prepared for a hop-plantation: it is either trenched two spit deep, trench-ploughed, or pits only are dug. The last mode appears to have come into practice about the year 1791, but it never was general, and is now nearly gone out of fashion. The three different methods have each their respective advocates, and probably their peculiar advantages: we shall briefly state what is urged in behalf of each mode of preparation.

1. By trenching the ground all over two spit deep, or double digging it, the manure is more regularly and intimately mixed with the soil: the soil itself is rendered so very open as to be easily penetrated by the roots of the hops while they are young and tender; and the breadth of ground over which they can spread when they reach their full growth, is much increased. Add to this, that every manual operation, though it were confined to the same work, does it more completely than the plough.

2. Trench-ploughing is considered as preferable by those who practise it, to double digging, not because they regard it as equally efficacious in promoting the general fertility of the soil, but because they consider it as effecting every desirable purpose at much less expense. Perhaps this may be true, if the double digging be deemed a part merely of the preparation; but if it is regarded as it ought to be, in connexion with the future management of the hop-ground, it will probably be found not only more efficacious, but on the whole, cheaper than any trench-ploughing that can be given. It is evident, that in proportion to the care and labour bestowed upon the ground during its preparation for

hops, will be the ease with which it will be worked during the continuance of the hops. When this circumstance is duly weighed, and the great importance of having the soil free and absorbent during the infancy of the plantation, is also taken into the account, the greater expense and labour attending trenching two-spit deep, cannot justly be considered as unprofitable. While, however, there are many who cannot afford the immediate expense, and others who prefer a present saving to a future gain, the mode of trench-ploughing hop-ground will always meet with advocates and practisers.

3. Perhaps hop-growers are less unwilling to adopt any new mode of culture, if it appear to promise success, than any other class of agriculturists: the expense attending hop-growing is so very great, the crop is so very uncertain, and the sale of superior samples at a very high price is so very easy and quick, that any new mode in the preparation or culture which promises to lessen the expense—to render the crop less precarious—or to improve the quality, is almost sure of finding followers. Mr. Marshall informs us, that in 1791, *pits* were growing into use, owing, as he was informed, to a mere incident of practice in which they happened to succeed; "and, being less expensive than double digging the entire soil, this incident (he adds) may possibly give a turn to the practice: whether a good or a bad one, a few years' experience will probably shew." This practice, as has already been observed, not being found to answer, never made any great progress, and is now nearly, if not wholly, laid aside; yet for any plant which did not, like the hop, extend its roots very far, and of course require the soil,

on every side of it to be frequently moved thoroughly, this mode of pitting would probably have answered extremely well.

As the Farnham hop-growers, looking forward to the very high price which their hops, if "full of condition," are sure to bring, do not scruple to employ any mode of preparation or culture, provided it secure their ultimate object, the best practice in these respects (that is, the best practice so far as regards effect only), may be justly looked for among them. This, at least, is the case in the preparation of the hop-ground; and it says a good deal for the foresight and good sense of the Farnham hop-planters, that they are disposed to sacrifice their present labour and money, in the hope of a future recompense; and not a little for their capital, that they are generally able to do it.

We subjoin the detail of a mode of preparation suggested by Mr. Malcolm, and which, he says, met with the approbation of several of the most experienced planters to whom he communicated it: it certainly deserves consideration, if not trial.

"Having made choice of a spot of ground for the plantation, at least twelve months before you mean to plant, let the ground be regularly trenched two spades deep, as soon after the preceding crop is off as you can: let it lie in that state through the winter, to sweeten and mellow, until February; then pare down the front of the ridge facing the south or west, draw a drill along it, and sow some early Nicholas pease, or the forwardest sort that can be got: during the season, they are to be regularly hand-hoed and landed up. If it is not desirable to pod them, that is, to sell them green as they become fit for gathering, they may stand for a crop; but the former mode is that which I recommend on the present occasion: they will then be cleared off the ground early in June. As soon as that is done, lay on it a good coat of rotten dung, at least 100 cubical loads to the acre. If this dung should be from the innkeeper's yard, so much the better. Cow-dung or night-soil, that has been once or twice turned over, would be desirable. Plough it in shallow; and in ten days, harrow it about, and plough it across somewhat deeper: sow it immediately with Norfolk turnips; but should it happen to be so late as July, I would advise the early Dutch turnip to be sown, for the reasons I have once before given, namely, that they may be got off the ground early: let them be twice hand-hoed, and folded off by the middle of November, which is quite as late as the latter sort can be kept good. Single-trench the ground as fast as it is cleared, and lay it up in sharp ridges, that the frost and weather may penetrate and pulverize it. The expense of trenching an acre of hop-ground at Farnham, in the way it is usually done, is 4*l.*: in the way I have proposed, it would necessarily be increased; but the superior state and condition of it, would more than compensate the apparent difference in the expense."—(*Malcolm's Surrey*, i. p. 500.)

*Manuring.*—From 25 to 30 loads of manure are laid on the ground, before it is double digged or trench-ploughed: well rotten stable-dung is principally used; but where there is so very great demand, as there necessarily must be round Farnham, all kinds of manure that are sufficiently rich, are had recourse to: for the preparatory manuring, dung is always laid on, if it can be got; for the dressing while the crop is growing, this is not deemed so very indispensable. The price of manure in the town of Farnham runs from 12*s.* to a guinea a load, according to the goodness of it: it is spread on the land for 2*d.* per load.

*Planting.*—The usual time for planting hops is the beginning or middle of March. The sets that are used for this purpose, are one-year "nurslings." These are cut off, in the preceding spring, from the lower part of the stem of the old hop, while it is dressing; they are then planted by themselves in a nursery, and the strongest of them are chosen next year for setting in the regular hop-plantation. The usual length of the cuttings is four or five inches, and it is desirable that they should have three or four buds or eyes: it is not much the practice about Farnham, to make use of "naked setts," as these are less quick in arriving at a proper state for planting than "nurslings." "Naked setts" are cut from the lower part of the stem, or more properly speaking, from the crown of the root, in the same manner, and at the same time, as those cuttings that are intended for the nursery; but instead of being put into a nursery, they are immediately planted in the hop-plantation: they are found, however, to be later, by one year at least, than the "nurslings," in becoming productive, and arriving at maturity. If the nursery plants are very luxuriant at the time they are taken up in order to be planted, it is thought better by some, to prune their roots and tops a little.

The practice of nurserymen, with respect to plants from which they take cuttings, has been recommended, viz. instead of cutting off the shoot from the parent stock, to twist it merely at the joint where it is intended to be put into the ground; to fasten this part into the ground; and, having cut off the top within one or two buds of the ground, to leave it there till it strikes root: it may then be entirely divided from the parent stock, and left till the time of planting. By this mode, it would probably advance considerably before the nursery cuttings; but, on the other hand, it would be either more neglected than those which were in a nursery by themselves, or injured during the different operations in the hop-plantation.

After the ground has been properly prepared, and the cuttings are ready, the next thing to be considered is the disposition and distance of planting them. These vary, in some small degree, every three or four years, and appear to have varied, perhaps, ever since hops were first planted about Farnham. In some of the oldest grounds, there appears little or no regularity in the disposition or distance: the hops, at least as they now stand, are irregular. It is difficult, however, to determine, whether this irregularity has been occasioned by the filling up of vacancies subsequently to the first planting, or whether they were originally planted in that manner. This irregularity was avoided, it would seem, soon afterwards; for in those grounds, which are very old, though not quite so old as those first mentioned, the *rows* are evident at regular distances, and the *hills* in the rows are also at determinate and regular distances: both these, however, vary—the distance of the rows, from seven to eight feet; and the distance of the hills, from three to four feet. When Mr. Marshall visited Farnham, the prevailing distance was six feet square: in one instance, he observed them nine feet by three. At present, some plant five feet square; others, five feet and a half; and others, again, make the distance of the rows nine feet, and of the hills four feet, from each other. Some put all the plants in one row, directly opposite those in the other: others, again, make the plants correspond only in every alternate row, so as to produce a quincunx: by this mode, greater room is given, and a freer and more equal current of air is admitted.

When the disposition and the distance are determined upon, the site of the different hills is measured out, and a small stick placed in each: at these places, the earth is dug out to the depth of two feet, and of nearly the same width. Three nursery plants are put into each hole: great nicety is observed in putting the plants in; the holes made by the dibble for that purpose are in a slanting position, so that the roots of the hop are spread out nearly to the extremity of the bottom of the hill, and the tops nearly meet on the surface of it.

Where the ground has been previously trenched two-spit deep, it is seldom necessary to break the ground that is taken out of the pits, because it is put in again about the roots of the plants; this, however, is carefully done, whenever the soil is found not to be sufficiently pulverized. Some of the most careful planters put the fine mould gently in, around and upon the plants, with the hand: the roots are sometimes put rather above than below the level of the ground, both in order that the top may rise high enough to form the hill round it, and that the root may have a greater depth of pulverized and open soil below it: for this part of the planting, however, there is no exact or general rule.

*Sort.*—There are several varieties of hops in the parish of Farnham: the best, and that which is cultivated to the greatest extent, is the "white-bine grape-hop."

Digitized by Google

hop." This valuable kind was first raised from a single cutting, by Peckham Williames, Esq. of Badshot Place, near Farnham, about 50 years ago: he would never suffer any other sort to be grown in his plantation, which is still kept up by that only. It has gradually extended into the neighbourhood; and on all good lands, is found to be the most profitable variety: it is much esteemed for being a large hop, full of "condition," and of a pleasant delicate bitter *.

The other sorts of white-bine are not much cultivated in the neighbourhood of Farnham.

A few of the "red-bine orchard-hop," a large coarse hop, are sometimes planted.

Another sort of red-bine, called the "never-black," has been lately introduced, and seems getting into repute and favour with many hop-growers: it is a hardy coarse hop, with rather an unpleasant bitter. It is said to have got its name of "never-black," not because the bine is never attacked with the black blight (since both the bine and the hop of this kind seem as liable to this disease as the other kinds), but because, although the outside of the hop is black with the blight, the inside is said not to be affected by it. The character or appearance of it, however, was thought to derogate so much from the high and established reputation of the Farnham hops, for superior delicacy and fineness, that the proprietors of the Blizam-hall Acre, on Wey-hill, where all the Farnham hops are sold, would not allow it to be brought into their *row*: those who cultivate the "never-black," have therefore been obliged to build a *row* for themselves.

---

* "Hops that are 'full of condition,' on being rubbed hard in the hand, emit a degree of odour, and disclose a degree of clamminess, which are universally admitted as criteria of their strength."—(*Marshall's Southern Counties*, i. 272.)

I was assured by a strong advocate for this new variety, that its appearance and quality would be much improved, if it were suffered to ripen thoroughly; but as it requires more time than the other kinds, and the Farnham hop-planters do not suffer even them to stand till they are full ripe, the "never-black" is always picked long before the proper season for it [*].

*Management First Year.*—The great object of the first year's management is, to keep the intervals clean, and to furnish the young plants with fresh, well pulverized soil. For these purposes, the intervals are hand-hoed, or dug with a spade: in the first case, the weeds that are cut up by the hoe, are carefully raked off; in the second, they are buried by the spade: the finest mould is then laid by the hand carefully round the tops of the hills. The oftener these operations are performed, the stronger and more healthy the plants become.

The length of pole which they require the first year, depends entirely upon their growth: sticks, or tops of old poles, from four to seven feet high, are commonly used, and the vines are twisted about them. Healthy and strong cuttings, planted on rich well-sheltered ground, frequently produce a few hops the first season.

---

[*] "It appears to be advisable, in raising FRESH VARIETIES, to revert to the seed, either of the wild or the cultivated kind. The varieties of hops, which are propagated by *cuttings*, as those of apples, or other fruits that are prolonged by *budding* or *grafting*, and of roots that are continued by *slips*, as the potatoe, have doubtless their durations given; and their declines may, sooner or later, be expected. And may not some of the fatal diseases to which hops are liable, be occasioned by the DECLINE OF VARIETIES?"—(*Marshall*, i. p. 184.)

I have quoted the preceding paragraph, not only because it contains an ingenious and important remark, but because it appears to me to contain the rudiments of the theory or discovery of Mr. Knight, respecting the failure of some of the oldest and best varieties of the apple, &c.

As soon as convenient after the regular time of hop-picking, the ground of the one-year old plantations is dug all over, turning it towards the plants: in this state it is left during the winter.

In the spring of the second year, it is necessary to open the hills, to cut off the last year's vines, and to prune the stem of the suckers. The hills are carefully opened with a hop-hoe, with a narrow point; the last year's vines are cut off with a pruning-knife, within an inch or two of the main stem, and the suckers quite close to it: the soil is then replaced round the plant. The hills are laid more bare about Farnham, than in most other hop districts.

During the whole of the second summer, the ground is kept clean and loose by the hand-hoe or spade: the autumn process varies; some planters repeat the digging that was given during the first year, others leave the ground undug till the spring. The second year they will generally require two poles about 14 feet high, to a hill. A few hops are produced the second year, but they are not gathered till the third, when the plants are considered as having arrived at maturity.

In the spring of the third year, the earth is removed from the tops of the hills; and the last year's vines, and the young suckers, are pruned as in the spring of the second year. By those who manure every other year, dung is now laid on, from 25 to 30 cart-loads per acre (having been carted on the ground the preceding winter): the hills are then dressed, either with this manure by itself, or with some of it mixed with the

Digitized by Google

the soil. This year they require a still longer pole than they did the second year—generally from 16 to 18 feet high.

*Ordinary Cultivation.*—On an acre of hop-ground there is usually laid, every other year, about 25 loads of good spit dung, which is the best manure for them. Some people lay on rags, hair, lime, or any mixen that can easily be procured. The manure is carted out on the ground during the winter's frost; and after it has been regularly spread, it is dug in with a "spud" during that season.

The "spud" is a spade, or more properly speaking, a fork with three tines, spanes, or prongs, about 18 inches long: the breadth of the spud is about nine or ten inches; the lower part of the prongs is flat, the upper part narrow and deep: the price of it is about 6*s*. This tool breaks the ground more completely, mixes the soil more intimately with the manure, and is less laborious to work with, than a common spade or fork. The expense of digging an acre with a spud, is 1*l*.

About the middle of March, the hills are opened with a "beck:" the cuttings are taken off (as already described), with a sharp knife, from the head or crown of the plant: when this operation is finished, a little mould is drawn gently over the hill, in order to keep it from "drying."

The use of the "beck" is confined to the Farnham district of hop-grounds. The "beck" is a double instrument: on one side or end of it is a strong hoe; on the other is a fork with two spanes or prongs, which, instead of being sharp and narrow, as those of the dung-fork are, are flat or broad. The principal use of this instrument will be afterwards described; but besides

Digitized by Google

sides its more important and common use, it is found, from its construction, peculiarly fitted for opening the hills in the spring.

*Poles.*—Whoever has attended carefully and minutely to the habits of climbing plants, must have remarked, that they seem to have a choice with respect to the kinds of timber about which they wind themselves; and that this choice has for its object, the growth or health of the plants. If we may judge from the vigour and branchiness of the ivy, when (other circumstances being the same) it is attached to a tree with a warm downy bark, this observation will be sufficiently confirmed; that the hop has the same liking, has been noticed by many hop-growers at Farnham, and in the other hop districts. A judicious, grave, and intelligent manager, in the district of Maidstone, in a conversation with Mr. Marshall, "particularised the maple, whose bark is peculiarly soft and warm; adding that he frequently observed, when the morning has been cold, the sensitive leader of a tender fresh-poled vine, reclining its head against the velvet bark of the maple, while others held theirs aloof from chilly smooth-barked poles."—(*Marshall*, i. 211.)

As, however, it is by no means probable, that this curious and interesting fact has been long or generally noticed, or that if it had, it would have surmounted other more palpable and powerful motives in the choice of the particular kinds of timber for hop-poles, we need not be surprised that, in the hop-plantations at Farnham, we now find almost every kind of wood used for that purpose. Until the quantity of land under hops increased to such an extent, as to render it difficult to procure poles, the ash and the withey appear to have been preferred at Farnham: the alder and the fir were also sometimes used. It would naturally be supposed, that the fir was very unfit for this purpose; yet, from the experiments of Mr. Giles, near Farnham, it appears that it answers extremely well: he has for several years used no other poles for hops than firs; and these he has found to answer as well, if not better, than ash or alder: he finds, with respect to duration, that the larch is the best; the Weymouth the second, and the Scotch and spruce the shortest.

The difficulty and expense of procuring poles of ash or withey, will of course induce the Farnham hop-planters to have recourse to many other kinds of timber, which formerly were deemed unfit for their purpose. They are still behind their brethren in Kent, in the variety of their poles. It is rather extraordinary that the chesnut, which stands foremost in the estimation of the Kentish hop-planters, should be almost unknown at Farnham: if this wood is not stript of its bark, there is perhaps no kind of timber which would make such durable hop-poles.

With respect to stripping the bark off the poles, there appears to be different opinions: it is plain, that if the most important object be the preservation of the pole from the worm, the bark ought to be stripped off; but if softness and warmth are of such great utility to the hop, the bark, at least where it is possessed of these properties, should be retained. There is one probable consequence of downy barks which ought to be ascertained; since, if it be found to exist, it may perhaps counterbalance the advantage of superior warmth and softness: as hops suffer so very much from the cold moisture brought by the north-east and east winds, may not a downy bark, by collecting and retaining that moisture, materially injure the hops? To destroy or diminish the effect of the cold and raw moisture of these winds, would certainly be of more consequence than to indulge the delicate nicety of the young hop.

The size of the poles must vary with the age and vigour of the hops: those required by the best hop-plantations are generally about twenty feet in length, and about two and a half or three inches in diameter, at the thicker end: on plantations where the soil is not so rich, and the hops of course not so vigorous and lofty, the poles are shorter, running from twelve to sixteen feet, with a proportionately small circumference: as the longer poles become shorter from the decay of the part which is inserted in the ground, they are used for less luxuriant vines.

I particularly inquired at Farnham, whether they were in the habit of charring the lower ends of the poles in order to preserve them: as far as I could learn, this practice, which certainly promises well, was not known, or at least, not followed; but some planters gave an imperfect kind of charring, by holding the thick ends of the poles over the smoke of a coal fire.

The number of poles required for an acre of hop-ground, runs from 2400 to 3000, according to the distance of the hills from one another. The price depends upon the size: the largest poles 20 feet high, were 36*s.* per hundred, in 1807: they are got principally from Sussex, Hampshire, and the Weald of Surrey: the shorter kinds, which are got partly from these counties and partly from the neighbourhood of Farnham, are from 18*s.* to 30*s.* It is the common calculation, that an acre of hop-grounds will require 500 poles annually, in order to supply the places of such as are injured or rotten at the bottom, or broken by the wind.

When the poles of the preceding year are stripped in order to be stacked, such of them as the labourers are suspicious of, are struck hard across, near the bottom, with an axe: if they stand this stroke, they are considered as sound and fit for the same height of vines the next year: if the bottom breaks off with the stroke, they are transferred to vines of a lower growth. If there happen to be a shed on the ground, it is used both to pick the hops in, if the weather should prove showery, and to secure the poles in during the winter. They are, however, generally "stacked" on the ground about Farnham: two methods of stacking are followed, one of which is peculiar to this district, the other is common to other districts: according to the first method, they are built horizontally in a triangular form, or like the roof of a house: those at the base (which is about six feet broad) are kept together by four poles, two at each end of the heap, put into the ground in such a slanting position, that their tops cross each other, and their sides lie against the side of the heap: these supporting poles are prevented from slipping or giving way by other poles which are laid on the part where they cross each other: the base of the heap is kept from the ground by some broken poles placed beneath them. According to the other method, they are set upright, the bottom parts spread out, and the tops inclining so as to form a cone: the support of this cone, which generally contains 300 poles, consists of four or six strong poles tied together at the top, and set deep and firm into the ground: in the spaces between these supporters, six or eight poles tied together a few feet from the ground, are put, the stackers going

Digitized by Google

going regularly round to give an equal weight to every division of the cone, till they have put in as great a number as they think will stand with safety.

*Poling.*—Soon after the hills have been opened with the beck, and the cuttings have been taken off the crown of the plant, it is necessary to prepare for the poling; as generally by the time these operations are finished, the young vines begin to raise their heads above the ground. The first step towards poling, is to throw down the stack in which the poles had been set up during the preceding winter: such of them as are stumped, or have had their ends broken off by the axe, are pointed afresh, and the points of the others are sharpened. The pointing about Farnham generally takes place immediately before the poling, seldom or ever before they are stacked, as is the practice in other districts.

As soon as the poles are pointed, they are laid out two to a hill; sometimes three are given to each hill. In adjusting the poles to the vines, and in setting them in the hills, a great deal of skill and attention is indispensably necessary. The vines may be either over poled or under poled; *i. e.* the poles may either be too long and heavy for the vines, or not sufficiently high and strong for them. The mischief arising from over poling is greater, and less easily remedied, than that which arises from under poling: it is therefore of greater consequence to guard against it.

It is not very easy to account for the fact, but it is sufficiently well ascertained, that hops which have been over poled the preceding year, lose a deal of their vigour and growth, which they do not soon or easily recover. It is therefore very desirable, that no poles should be put into a hill, where there is not good reason to expect that the vines will grow to an equal length. It is not, however, easy to foresee all the circumstances that will act on the growth of the hops. The condition of the ground may be pretty well ascertained; the labour and manure given it are known; but the favourableness or unfavourableness of the succeeding season can only be obscurely conjectured; and as the experience of the Farnham hop-planters has convinced them, that more depends upon the season, than upon the state of the ground, they always consider it preferable to allot a shorter pole than in all probability the vine will require.

The evil that results from the vines being underpoled, is evident: they must drop down after they have reached the top, and keep the air and sun from those parts above which they fall; in this case, there is no remedy but substituting a larger pole, or adding an auxiliary pole.

As soon as the size of the pole is determined upon, their position with respect to the line of hills is next to be attended to: some place the poles in the direction of the rows; some across them; others again, especially where the distance between the rows is trifling, and that between the hills great, place the poles of the first hill in the line of the row, and the poles of the next hill across the row, and so on alternately: the great object being to afford all the vines, as much as possible, an equal share of air and sunshine.

With respect to the inclination at which the poles are put into the hills, it is directly the reverse of that which was given to the plants when they were set: they, it will be recollected, had their roots diverging,

, and their tops converging: the bottoms of the poles on the contrary, are much nearer each other than their tops: this is considered as of much consequence, from the well known fact, that poles that spread at top, by affording more room, air, and sunshine to each vine, produce the greatest crop.

*Tying.*—This operation immediately follows that of poling: or, more properly speaking, they are both going on at the same time in different parts of the plantation. The month of May is generally the season in which most of the tying is performed: women and children are employed for this purpose.

Rushes, bass-matting, &c. are used for tying the vines: the former not green, as is commonly the case in Kent, but prepared and dryed the preceding year for this purpose.

The number of vines trained to each pole, is two or three, according to their present appearance and probable future luxuriancy; such are preferred as are neither too strong and stubborn, nor too weak and sickly: the great object is to select such vines as not only promise to be healthy and luxuriant, but also to throw all their luxuriance into the main leading stem, and not into the side branches.

At the first tying, two rushes only are necessary: one to tie the vine about a foot above the ground, the other to tie it about a foot higher: as the vine grows, these are removed higher up the pole, or they are only loosened and others tied above them: towards the middle of May, the vines generally require no more ties.

Both the wild and the cultivated hop follow the sun in their twinings: when they are fastened to the pole, therefore, this inclination of theirs is complied with*.

There is perhaps, no part of the business of the hop-grower which requires to be so well timed as tying the vines: if it is delayed till they spread along the ground, it is difficult without injuring them to change their creeping disposition: at the same time it is adviseable that they should be sufficiently long to be placed to the pole, without slanting them too much from the root.

It has been already noticed, that it is sometimes necessary to substitute a taller pole for one that is not sufficiently long and strong; or to interchange the poles of the over-poled or under-poled vines. This necessarily requires a careful and steady hand to draw out the vine, and lay it gently and regularly on the ground till the proper pole is brought to it: still greater nicety is required in observing all the curves of the vine while it is wound round its new pole.

*Culture.*—As soon as the poles are put up, and the vines tied to them, the ground is "becked" for the first time: by the use of this implement, the ground, hardened by the rain and sun, is loosened and opened to the depth of three or four inches; and the weeds are entirely cut up and destroyed. When the *spanes* will not penetrate into the soil, the *beck* is turned and the *hoe-side* applied.

---

* A friend of mine assured me, that he had often attempted to make the wild-hop climb in a direction contrary to that of the sun, but that he could never succeed: he thought the hop was singular in this *inclination*, but many other climbing plants have the same preference: there are some indeed, which climb in a contrary direction, with the same *inflexible steadiness*.

About Midsummer, the vines that lie on the ground and were rejected when the tying took place, are cut off, and the full and permanent form given to the hills. By this mode, the ground over which the superfluous vines creep, is kept moist, while the trained vines are too young to effect that purpose: and by cutting them so late, they are prevented from shooting again during the remainder of the season.

The "branching" takes place about the same time as the preceding operation: though some planters defer it till the blossom is fairly set; as then they consider the object of it more effectually secured. It consists in taking off the leaves and branches to the height of three or four feet, in order to allow the air and sun to enter more freely, and to give all the nourishment to the productive shoots.

After this the ground is "becked" the second time, and "half-hilled:" this is to draw up a little mould into the crown of the hill, with the *hoe-side* of the beck. The object of the second "becking" is precisely the same as that of the first, and it is performed in the same manner; only, as the ground is now less stiff and hard, and the weeds less numerous, with more ease and dispatch. A few weeks afterwards, a little more mould is drawn up by the "beck" to each hill: during the remainder of the season the "beck" is not used.

Just before the hop-picking, the ground is hoed or "peared:" this is to destroy such weeds as have come up since the second becking: and as the ground does not now need to be loosened over its whole surface, a common hoe only is used. In case the moistness of the season, or the richness of the ground, brings forward the weeds before the first "becking," or between the first and second becking, the ground is also hoed or "peared" at these times.

Such is the usual routine of management in the hop-plantations round Farnham: the striking and leading difference between it and that which is followed in Kent and other districts, is, that *here* no implements are used, every thing is done by man. Whether this preference of manual labour arises from its paying better by the superior productiveness or superior quality of the hops, or from its having been found most suitable to the soil about Farnham, it is difficult to determine: the hop-growers there say that the nidgets, &c. of Kent will not answer with them: this it seems not very easy to conceive: the soils near Farnham and in Kent varying greatly in both places, must in many spots resemble each other. How far the manual labour conduces to the superior quality or superior character of the Farnham hops, will be considered afterwards.

*Distempers.*—There is perhaps no plant that is cultivated by man, that is subject to such a variety of diseases as the hop: during every part of its growth, it is liable to be attacked, notwithstanding the utmost precaution and care are taken; and the attacks are often so rapid, that there would be no time to ward off or resist them, even if the cause of them were well ascertained. This, however, is by no means the case; for although some of the diseases of hops are evidently occasioned by insects, yet the particular state of the atmosphere, soil, or plant, which invites and supports these insects more in one year than in another, is far from being ascertained, or even brought within the reach of probable conjecture. There can be no doubt, that a cold or unsettled and varying state of the atmosphere, will injure hops as well as other plants, either directly or indirectly, by encouraging the attacks of insects: but there is good reason to believe (at least it is the common opinion), that seasons *rather favourable* to other plants are injurious to the hop.

The diseases of hops, in the order of their attack, are, 1st, "the little black bob:" 2d, "the long-winged fly:" 3d, "lice:" 4th, "the fire blast:" and 5th, "the mould."

1st, "*The Little Black Bob.*"—From the description given me of this insect, and from the circumstance of its eating the leaves, but not touching the "nerves," it appears to be a species of the *chrysomela:* Mr. Marshall says, it is the *chrysomela nemorum**. As soon as the young vine appears, this insect seizes on the leaves: if the weather happens to be dry at this season, they are very numerous and strong, so as almost to overpower the young plant as it rises above the ground. In the spring of this year (1807), the "bob" never left them, but kept continually eating holes in the leaves: and even when the hop was formed into "pops," and had nearly reached its full size, this insect ate the heart of the hop out, and gave the plants that appearance which is called the "red blight."

2d, "*The Long-winged Fly.*"—This is probably the "musca morio" of Linnæus, from the name, descriptive of the length of its wings, and from its being represented as nearly of the size and appearance of the common garden fly.

This fly is said to arrive and settle on the hops in greatest numbers when the wind is from the east, attended with dry weather: they generally arrive about Midsummer: this year they came early, and continued till they were washed or driven off by the rain, which fell in July. They extend themselves over the branches as well as the leaves; and are *believed* to lay a great number of eggs, from which the small insects, called lice, proceed. This is certainly a mistake, as these insects, which will be particularly noticed immediately, are quite a distinct kind. Another opinion, better founded, though probably not correct, is, that these small insects come along with the "long-winged fly."

---

* This insect evidently belongs to the second section of the genus *chrysomela*, as it leaps with surprising agility.

3d, "*The Lice.*"—These, as we have just mentioned, are supposed by many to accompany the fly; they are a species of *aphis*, probably the *aphis fabæ*[*]: but there are several objections to this opinion: the aphis tribe, I believe, are not attached to other insects: the young aphides are known to be deposited by the females, in the plants to which they belong, and do not come out till the beginning of summer: many of the *musca* tribe, particularly those that frequent gardens, are known to feed on the aphis: all these circumstances certainly render it improbable that the aphides should be brought by the fly. Is it not even probable, that the fly, when it is supposed to be injuring the hop, by perforating it, is merely searching for and destroying the aphides?

The aphis, when it is abundant, is the worst enemy the hop has: the leaves are completely covered by it

---

[*] This at least is certain, that the hop-growers in the district of Canterbury, plant beans in the intervals of their plantations, under the conviction that they attract the vermin or aphis (Marshall's Southern Counties, i. 401); and that the same species of coccinella is found to devour the aphis of the hop and the aphis of the bean.

Digitized by Google

with filth of a dirty black colour, and an unpleasant smell: this is called the BLACK BLIGHT. It is well known that all the aphis tribe exude, partly from the horns on their abdomen, and partly from two orifices at the same place, a sweetish juice, which attracts other insects; so that it is probable that the hop is injured, both by the sap of the plant being sucked out by the aphis, and by the attacks of such insects as are attracted by the sweet juice of the aphis.

Fortunately there is an insect which preys upon these destructive vermin; this is the larvæ of the lady-bird *(coccinella septem punctata)*, known about Farnham by the name of "serpents:" this year, when the aphides were remarkably numerous, they were devoured both by the larvæ of the lady-bird, and by the lady-bird itself, which, it is well known, swarmed every where in the South of England.

4th, "*The Fire-Blast.*"—This disease generally attacks the hop-grounds in July: it discovers itself in the yellow parched appearance of the leaves, which are completely scorched. A humid moist morning, succeeded by a very hot, sultry, close day, is supposed to bring on this disease. It often happens, that only parts of a plantation suffer from the fire-blast, while other parts are entirely free from it: this most probably arises from the greater quantity of moisture arising from those particular parts, or from the air there being more confined and stagnant, or perhaps from both these circumstances combined. Hops in a low, damp, unventilated situation, are certainly more affected with this disorder, than those which stand high and open. It seldom happens that the hops recover from the fire-blast to such a degree, as to produce a good and abundant crop: the earlier the attack, the greater probability is there, in most instances, that the hops will get the better of it.

5th, "*The Mould, or Fen.*"—This disorder is evidently of vegetable origin: by some planters it is attributed to the too great richness of the soil; by others, to the perspiration being stopped by the cold and moisture of the season. The mould, when it first makes its appearance, is of a pure white colour, which gradually changes to a dark brown. It is considered as an infectious disorder; at least it is said, that whenever any particular part of a hop-plantation is seized with it, the other parts seldom escape; but this most probably arises from the cause of mould existing among all the parts of the plantation.

The mould attacks both the leaves and the hop: it generally begins at the bottom of the hop, and creeps to the extreme end of it; depriving the scales of their springiness as it advances, and making them close and adhere to one another.

There is no remedy that can be depended upon for any of these disorders: a few smart showers of rain will wash away the flies and aphides; but if the rains continue long, they produce or encourage the mould. Many remedies have been suggested, and some applied, for the different disorders of the hops; most of them have proved completely unsuccessful; others have appeared to be efficacious in a few instances, or in particular spots; but when applied another year, or to other plantations, they have entirely failed. While there is such complete ignorance of the real cause of all these different disorders, it is vain, and may be prejudicial, to attempt to remove them. Experiments are much wanted on the diseases of plants in general: till these are made accurately, and observation is more closely on the watch, we must necessarily be entirely in the dark on this important subject.

*Picking.*—The practice of Farnham, with respect to the state of ripeness at which they begin to pick their hops, varies very much from that which is usual in the other hop districts. As the great object of the Farnham planters is, to get a delicate sample, they are careful not to let the hop stand so long as to take on a decidedly yellow colour, or to give out a strong degree of bitterness. Having these objects in view, they begin picking when the hops are rather under-ripe, generally about the end of August, or the beginning of September.

The weather deemed most favourable for picking, is that which is neither very sultry nor moist: rainy weather is of course extremely unfavourable. If the sun is very hot and scorching, it is apt to shrivel and discolour the hops before they can be gathered off the poles and carried to the kiln: if the mornings are moist or dewy, the hops that are gathered then become musty. To prevent the hops being injured by the hot sun, the pole-pullers take down no more poles than the pickers can pick in a short time: if it is necessary to begin picking while the dew remains, the pole is shook to and fro, in order to throw off as much of it as possible.

The people employed are divided into two sets—those who cut the vines, and draw the poles; and those who pick the hops: the former are men; the latter, men, women, and children. They are collected in great numbers from the adjoining counties, and from Portsmouth.

The vines are cut about three feet from the ground, in order to prevent the bleeding, which, from their imperfect state of ripeness, would take place, if they were cut nearer the root. The poles are then drawn out of the ground, and laid horizontally by the sides of the bin. The bin is a frame of wood, four feet square, with legs which raise it three feet from the ground: a bag made of coarse cloth, and which holds seven bushels, is fastened by hooks to the frame or bin: the poles, which had been laid by the pole-pullers by the side of the bin, are lifted up by the pickers, and placed upon the end of the frame, which rises above the bag for this purpose. Sometimes one pole only is raised at a time, which is picked by two pickers; sometimes a pole is lifted up on each side of the frame, and picked by four pickers, two to each pole.

It is peculiar to the Farnham practice, to begin at the bottom of the pole, and to pick the hops one by one, without bunches, *long tails*, or leaves: great attention is also paid to the sorting of them during the picking. They are divided, at least, into three kinds: those that are just of the proper degree of ripeness, and are full and fair in their appearance, are first gathered off the vines, and put by themselves into the bin-cloth; such as are rather inferior in quality, or not exactly taken at the proper degree of ripeness, are of the second sort, and are likewise put by themselves in a basket: as, however, with the Farnham planters, hops that are under-ripe are more esteemed and valuable than such as are over-ripe, the second sort takes in only the greenish hops: such as are brown and over-ripe, are the third sort; and, if the grower is very nice, a fourth basket is set for such as are defective in their form, or have received a check during their growth. The bag is emptied as often as it requires it in the course of the picking, and the hops are carried to the kiln.

As the pickers are commonly paid by the bushel, and it is found convenient or agreeable to the planter or pickers, to settle their accounts at the end of the season, tokens are given for every bushel picked; and when these bushels amount to 20, the holder delivers them to the master, who cuts a notch on a tally kept for that purpose*.

*Drying.*—It is of the greatest consequence, that the hops should be dried as soon as possible after they are picked; since, if they are kept in the baskets in which they are brought from the grounds long, they are apt to heat and spoil. Great nicety is required in regulating the heat of the kiln, in order that the hops may not dry too fast, by which they are apt to be burnt:

---

[*] "'The Double Tally.'—This beautifully simple device, which surely might be applied with profit on various other occasions, is formed of two thin pieces of wood, each of them being about nine inches long, one inch and a half broad, and a quarter of an inch thick. These are neatly planed, and accurately fitted together by means of a shoulder formed on the principal part, or *tally*, which is three inches louger than the inferior part, or check; the two, when joined together, making the double tally, which is twelve inches long, one inch and a half wide, and one inch and a half thick from end to end.

"One of these double tallies is appropriated to each party, or single person (picking alone), who receives the check part, the tally remaining with the steward; each of them being previously identified with the same number."—(*Marshall's Southern Counties*, i. 252.)

The price per bushel varies with the crop, and seems to have increased much within 20 years: about 1790, the common price was 1½*d.* per bushel; in 1791, the crop being bad, 2*d.* was given; while in 1801, the crop being uncommonly large, the pickers agreed to take 2*d.* per bushel. The pickers are allowed small-beer; the pole-pullers, ale.

the thickness or quantity of the hops must depend upon their state; if they are full of moisture, from being under-ripe, or from the dampness of the season, they should be laid on the kiln very thin, and a very moderate degree of heat should be applied, otherwise the steam arising from them will make them cake, or run into lumps. In order to prevent this at Farnham, where, as has been already mentioned, the hops are gathered green, many kilns have two floors, one about five or six feet above the other: the hops that are greenest, or contain most moisture, are put on the upper floor, and are thus dried very gradually, and fitted to receive and support the greater heat of the lower floor.

In the early part of the season, or during moist weather, the hops yield less from the kiln than when they become riper or drier: it takes five pounds of moist or under-ripe hops, and four pounds of dry ripe hops, to make one pound when they are taken from the kiln. They are generally 12 hours on the hair. When the upper part of the hops appear to have felt the fire, they are turned: before this is done, it is judged prudent to lower the temperature a little, and to restore it when the turning has taken place. When the hops are brittle, or crisp, they are considered as sufficiently dried: if they are taken off before they are completely dried, they are apt to lose their flavour, to diminish in bulk, and even to spoil well-dried hops, if they are put among them.

The Farnham hop-growers seldom use any kind of fuel but charcoal; partly because it is deemed the most proper for the purpose of drying the hops, as being the most secure from communicating any particular smell or flavour, or from injuring the delicacy of their colour; but principally, perhaps, because coke cannot be easily or cheaply procured. Sea-coal has been tried, but it left such a flavour on the hops, as prevented their sale at Weyhill. A ton of hops is calculated to require about 90 bushels of charcoal, which, at 1*s*. per bushel, is 4*l*. 10*s*. per ton. Sulphur *is said* to have been sometimes used at Farnham, but to have been laid aside, from a conviction of its being unlawful: this certainly would have deterred the Farnham hop-growers, if they had had previously any motive to use sulphur; but as their great object is to keep the colour of their hops pale, and the evident tendency, if not the sole object, of employing sulphur, is to give the hop a bright yellow colour, it is not likely that it ever has been, or will be, much used about Farnham.

From the state of extreme brittleness in which well-dried hops are, when taken from the kiln, it is evident that they are not in a proper condition to be put into the pockets immediately: before the bagging takes place, they are therefore carried into the store-room, and laid in heaps, in order to give them that degree of softness which will permit them to be pressed into the pockets, without breaking down into powder. As soon as they get the proper degree of toughness and tenacity, they are fit for

*Bagging*.—All the finer hops, or those of the "first picking," are, at Farnham, put into "pockets:" only the inferior kinds are put into "bags." These differ in the materials of which they are made, their size, and the quantity or weight of hops which they contain. Bags are made of what is called Canterbury pocketting, which is much finer than what is used for the same purpose in many of the other hop districts: they are about seven feet and a half long, and about eight feet in circumference: they contain 2½ cwt. of hops. The pockets are always made of fine canvas, about five feet and three quarters in circumference, and nearly of the same length as the bags: half a bag, or 1¼ cwt. is put into each pocket: 4 lb. are allowed for the weight of the canvas.

The following is the mode of putting the hops into the pockets: a round hole, sufficiently large to admit the full pocket, is made in the floor of the bagging-room: a few hops are tied tight in the two lower corners of the pocket (in the same manner as is done in wool-sacks), in order that when full, they may be lifted or swung with ease. A hoop, rather larger than the circumference of the hole, is used to stretch out the pocket, by means of hooks on the outer side of it: the inner side of the hoop, when the pocket is let down into the hole in the floor, resting on the floor, or on a frame of wood laid over the mouth of the hole. When the pocket is thus stretched out, and let into the opening, the "feeder" throws a few shovelfuls down; and the "bagster," descending, presses them firm and close, especially towards the bottom and sides of the pocket: more hops are thrown down, and carefully and regularly pressed till the pocket is filled: half an hour is generally required to fill a pocket.

*Expenses.*—The expenses of a hop-plantation are much greater at Farnham than in any other hop district in the kingdom. Independently of the very high rent, the labour, being all performed by the hand, is much more expensive, and the quantity of manure applied per acre more considerable.

The gross calculation, including the rent, is 36*l.* per acre: it would be difficult, however, to state all the particulars that would make up that sum, even allowing it were exactly true. The following is probably a pretty accurate statement of the annual expenses per acre, setting aside the rent, and taxes and tithe, which of course differ according to the rent; and the picking, carriage, drying, stowing, and bagging, which vary with the crop.

| | | | |
|---|---|---|---|
| Manure, | £.8 | 0 | 0 |
| Spreading, | 0 | 3 | 0 |
| Digging, | 1 | 0 | 0 |
| Cutting, | 0 | 8 | 0 |
| Throwing the poles, and laying them out, | 0 | 7 | 0 |
| Sharpening the poles, | 0 | 9 | 0 |
| Poling, | 0 | 8 | 0 |
| Tying, | 0 | 8 | 0 |
| Becking the first time, | 0 | 8 | 0 |
| ——— the second time, | 0 | 5 | 0 |
| Half-hilling, | 0 | 2 | 6 |
| Hilling, | 0 | 8 | 0 |
| Hoeing, | 0 | 5 | 0 |
| Stripping and stacking, | 0 | 8 | 0 |
| 500 new poles, at 28*s.* per 100 over-head; deducting 6*s.* per 100 for the old poles, | 5 | 10 | 0 |
| Sundry expenses for shifting the poles, &c. | 0 | 8 | 0 |
| | £.18 | 17 | 6 |

The rent, taxes, and tithe, on lands of a medium quality, may amount to 12*l.* per acre: the expenses of picking, drying, packing, &c. on the average produce of such lands, to about 6*l.* per acre, making in the whole,

| | | | |
|---|---|---|---|
| Manure, labour, and poles, | £.18 | 17 | 6 |
| Rent, tithe, taxes, | 12 | 0 | 0 |
| Picking, &c. | 6 | 0 | 0 |
| | £.36 | 17 | 6 |

Of this enormous sum, 31*l.* 17*s.* 6*d.* must be expended, whatever the crop may prove to be. When this is considered, and the risk, trouble, and expense of filling up annually such hills as lose their plants, are taken into the account, the hop-planter would seem to require, not only a good crop, but a high price for his hops.

The different implements necessary for a hop-plantation, most of which have already been described, and their uses pointed out, are subjoined, with their prices.

| | | | |
|---|---|---|---|
| A spud, | £.0 | 6 | 0 |
| A beck, | 0 | 5 | 0 |
| Ten-inch hoe, | 0 | 2 | 6 |
| Fourteen-inch hoe, | 0 | 3 | 6 |
| Picking-basket, | 0 | 6 | 0 |
| Scales and weights, | 5 | 0 | 0 |
| Bin, | 0 | 3 | 6 |
| Hop-bar, | 0 | 7 | 0 |
| | £.6 | 13 | 0 |

The kiln, store-room, bagging-room, if they are of a moderate size, will cost nearly 300*l.*[*]

---

[*] A fourteen-feet kiln will dry in the 24 hours, *i. e.* at two dryings, 200 bushels of hops from the vine, or about 350 lb. of dry hops.

The first expense of poling, reckoning 2700 poles to the acre, and 28*s*. per hundred over-head for the poles, will amount to 37*l*. 16*s*. per acre.

*Produce.*—It is extremely difficult to fix on any produce that will approach within any tolerable degree of accuracy to the real average. This does not arise so much from the difference of the soil or management, as from the great difference between the crops of different years. It sometimes happens, that the hops on the vines are actually not worth the expense of picking; or will barely pay the men who strip and stack the poles. On the other hand, I was informed that a ton, and even 24 cwt. had sometimes been picked off an acre of some of the very best grounds, in a singularly favourable season: this, however, was mentioned as very extraordinary, and not to be admitted into the calculation, or even into the expectation of the planter. Four or five hundred weight is counted but a poor crop on lands of a medium quality: six, seven, or eight cwt. a good crop on the same lands: on the best lands, in favourable seasons, ten, twelve, and fifteen cwt. are not unfrequently grown, perhaps the average produce of lands of a medium quality may be laid at 6½ cwt. per acre*.

The price of hops varies as much as the produce:

---

* Some seasons are talked of at Farnham as remarkable both for the great quantity and the superior quality of the hops: in the year 1778, there was a very large crop, but that in 1801 was still more abundant. At Michaelmas Weyhill fair, that year, 6000 pockets out of 16,000, were from Farnham, and the prime *Farnhams* were all cleared off in about four hours. In 1803, when the crop of hops was good, the average produce of the parish of Farnham *was laid at seven or eight cwt. per acre.*

the Farnham hops are always, however, at the top of the market. In the other districts, the "bag-hops" are generally from 12*s*. to 16*s*. per cwt. below their "pocket," or finer hops: and the Farnham pocket hops are not unfrequently one-third above the pocket hops of the other districts: sometimes they are nearly double the price. In 1803, when the crops were very good in all the hop districts, the prices, soon after the hop-picking was over, were for pockets per cwt. Kent and Sussex, from 5*l*. to 6*l*.; Farnham, from 7*l*. to 8*l*. 10*s*. This year, when the crops were extremely bad every where, the prices on the 6th of November were as follow:

| | *Pockets.* | *Per cwt.* |
|---|---|---|
| Kent, | £.5 0 | £.6 10 |
| Sussex, | 5 0 | 5 16 |
| Farnham, | 8 8 | 10 0* |

If we take the average price of Farnham hops at 7*l*. 15*s*. per cwt. the medium between 7*l*. and 8*l*. 10*s*. and the average produce at 6½ cwt. per acre, the gross sum will be 50*l*. 7*s*. 6*d*. per acre; from this are to be deducted, the rent, taxes, expense, &c. 36*l*. 17*s*. 6*d*.

---

* In October 1807, the prices of bags and pockets were as follow:

| | *Bags.* | *Per cwt.* |
|---|---|---|
| Kent, | £.5 0 | £.6 0 |
| Sussex, | 5 0 | 5 16 |
| Essex, | 5 0 | 5 16 |
| | *Pockets.* | *Per cwt.* |
| Kent, | £.5 10 | £.7 7 |
| Sussex, | 5 0 | 6 16 |
| Farnham, | 8 0 | 11 0 |

and the duty, which at present amounts to 1*l*. 3*s*. 4*d*. per cwt. or to 7*l*. 11*s*. 8*d*. on 6½ cwt., the supposed produce; and the nett remaining sum will be 5*l*. 18*s*. 4*d*. per acre. When we consider the legal interest of the money laid out at first on the kiln, poles, &c. and the per centage that should be allowed for the wear and tear of the former and of the different implements, the profit per acre will not appear great. To this it is proper to add, that the small extent of the hop-plantations necessarily confines the whole profit to a small sum, even though the profit per acre may be deemed large. The largest plantation about Farnham does not reach 60 acres: there is another, I believe, about 40 acres, but in general they do not reach above ten or twenty acres.

The great mart for the Farnham hops is Weyhill fair: they are bought there principally by dealers, who retail them to private families, by whom they are preferred on account of the paleness of colour and delicacy of flavour which they give to malt liquor. Every pocket is stamped with a particular device, which is changed regularly every year: and the Farnham hop-growers bind themselves under a severe penalty, not to put any other hops but those grown about Farnham into the pockets thus marked. The refusal of the proprietors of the Blizam-hall acre at Weyhill fair (already noticed), to admit the " never-blacks," seems to have arisen from the fear that these large coarse looking hops would injure the reputation of the Farnham produce.

Having finished this detailed account of the manage- of the Farnham hop-growers, it may be interesting, if not useful, to inquire

1. Upon what quality or circumstance, the reputation,

tion, and consequent high price, of the Farnham hop depends.

2. To what we ought to ascribe the peculiar quality of the Farnham hops.

1. In comparing the hops in a pocket marked with the Farnham device, with the hops in a pocket of any other district, we immediately perceive that they are mixed with fewer long-tails and leaves, and that they are not so bunchy: in short, that they are better sorted than the other hops. When we come to examine them by the smell, hand, and taste, we find them possessed of the peculiar qualities of the hop in an inferior or less palpable degree: the Farnham growers say they are more delicate: to the eye they are much paler, of course they do not colour the ale so highly, nor give it that harsh bitter which other hops produce. These two circumstances, their being better sorted and cleaned, and their being possessed of superior delicacy (to apply the most favourable term), enable the Farnham hop-growers to sell their hops so much above the market price of other hops.

2. As no doubt can be entertained respecting the management which makes the Farnham hops freer from bunches and leaves, we shall proceed to enquire upon what cause their superior delicacy depends. By some, this is attributed to the soil; but by those who have examined the soil at Farnham, and compared it with the soil in the other hop districts, particularly in Kent, this opinion is utterly rejected; since in Kent there are soils equally good and equally favourable to the culture of the hop: many even of the Farnham planters allow, that their soil is not so very peculiar in its richness or hop-bearing quality, as to account for the superior delicacy of their hops.

It cannot be ascribed to the particular variety of hop which is cultivated at Farnham: no doubt, the "white vine" yields finer hops than the "red vine;" and more perhaps of the former are grown at Farnham, in proportion to the extent of plantation, than in the other districts: but it is by no means confined to Farnham. It may indeed, perhaps be thought, that there is a particular sub-variety at Farnham; but cuttings from the best of the Farnham hops have been sent into Kent, and if this were really the cause of the superiority, we may be assured it would long before this have produced the same effect there as at Farnham.

The more intelligent and less prejudiced of the Farnham hop-growers, ascribe the superior delicacy of their hops to their superior attention and management: before determining on this point, it is necessary to consider what part of the management they allude to. It cannot be their substituting manual instead of team labour: their working their ground more, or their giving it a greater quantity of manure: these circumstances would probably ensure a better crop in most seasons, but can hardly be considered as having much effect, if any, upon the quality. In what other respect then do they differ from the growers in other districts, in the management of their hops? To that, whatever it may be, we may fairly trace the superior quality of their hops, even if we had no direct and positive proof that it is actually the cause.

The Farnham hop-growers pick their hops much sooner than is usual in the other districts: not merely sooner in the season, for that might arise from a better climate, or a warmer soil, or exposure; but sooner, as regards the state of ripeness of the hops. It is hardly necessary to state, that hops picked before they are fully ripe, must be of a paler colour, and with less of their peculiar smell and flavour, than hops which are permitted to stand till they are full ripe: in other words, the superior delicacy (as it is called) and the consequent higher price of the Farnham hops, arise principally, if not solely, from the circumstance that they are picked before they are ripe. It is not necessary, however, to leave this conclusion to be drawn from what we know must be the effect of picking them under ripe: there is still more direct proof: *hops gathered at Farnham, after the "fine kinds," i. e. in a state of perfect ripeness from the same plantation, are kept by themselves as inferior hops, and sold at inferior prices.* The conclusion therefore seems perfectly just, indeed inevitable, that the peculiar qualities of the Farnham fine hops, depend entirely upon their being gathered before they are fully ripe. We shall not examine whether such hops ought to be called *more delicate*, or *weaker* than those of other districts.

A very curious and natural question arises: if the superior quality arises from the time they are picked, and not from the soil, how comes it that such high rents are given at Farnham, and that the growers in other districts having their land much cheaper, do not undersell the Farnham growers? The only answer that in my opinion can be given to this question, will let us still more into the cause of the high price of the Farnham hops. It is plain, with respect to the growers of other districts, that if the soil does not cause the superior quality of the Farnham hops, they (having their land at a lower rent) might undersell the Farnham growers, even if the whole management of this district were adopted, on the supposition that every part of it contributed to the superior quality. It is equally plain, that the Farnham hop-growers, by transferring their mode of management to other districts, might still grow as good hops, and have their lands at a lower rent. It is not the soil, therefore, nor the management, nor even the time of picking, and the consequent delicacy alone, that commands the high price: *the name of Farnham hops* has not a little influence also: the high rent about Farnham is given not so much for the *soil* as the *name;* and the growers of other districts, though they might produce the quality of Farnham hops, yet from being deprived of the name, would not be able to undersell them.

## SECT. XXV.—FLAX.

THIS plant appears never to have been extensively cultivated in Surrey, and is now almost entirely banished from it. Two causes are usually assigned for this: though probably, without the co-operation of some other causes which will be noticed afterwards, they would scarcely have banished it so entirely.

In the first place, the restriction generally introduced into the leases of this county, which forbids the tenants to sow it, is held out as the principal and leading cause of the decrease in the cultivation of this plant. But this is hardly consistent with the common and well founded complaint, that the farmers in Surrey pay so little attention to the clauses in their leases, and to the interests of their landlords, that they too often leave their farms in such a state of exhaustion, as to require much money, labour, and time, before they can be recruited.

In

Digitized by Google

In the second place, it is said that a strong and unfounded prejudice against British flax has diminished the culture of it through the whole kingdom, and that Surrey has only suffered in this respect with the kingdom at large. A diminished demand for British flax would no doubt lessen the growth of it; but there are other reasons which probably had considerable weight.

In the first place, the climate of Surrey does not seem exactly suited to this plant: it requires a moist climate, both to secure a good crop, and to improve the quality of the flax.

In the second place, land lately broken up is considered best for flax: of this there is very little in Surrey.

In the third place, the water in many parts of this county being impregnated with calcareous matter, is not proper for the steeping of flax.

But the experience of this crop being less certain, more troublesome, and, reckoning all the labour it requires, more expensive than other crops better suited to the soil and climate of Surrey, must be considered as the most powerful reason, why the culture of it has been in a great measure given up.

At present it is cultivated only in the south-eastern division of the county, on the borders of Kent; and even there it is confined to a few acres.

There is nothing peculiar in the management of the crop: but from its now being considered as of comparatively little importance, and from its requiring attention and labour, when the principal and more valuable crops are employing all the hands, it is often suffered to be choked and injured by weeds.

Most of the flax grown in Surrey is manufactured within the county, or at East Grinstead in Sussex.

The Surrey flax-dressers seldom put more than four

pounds

pounds into a bundle; whereas the usual quantity in other parts of the kingdom is six pounds.

It is by no means probable that the culture of flax will ever again be established in this county: if the soil of the waste lands were favourable to it, still the dryness of the climate would render this application of them by no means adviseable.

## SECT. XXVI.—PHYSICAL PLANTS.

It is reckoned, that a greater quantity of land is employed in raising physical plants in Surrey than in any any other county in England. Several of these are no doubt, cultivated on a larger scale elsewhere; but if the whole extent of ground under these plants be taken into the calculation, this county will be found to stand foremost.

Those which are grown to the greatest extent are peppermint, lavender, wormwood, chamomile, aniseed, liquorice, and poppy.

By far the greatest part of the physic gardens lie in the parish of Mitcham, in the hundred of Wallington, about nine miles from London. The soil used for this purpose is, as may naturally be supposed, rendered extremely rich by art, as well as originally of a good quality: it is what is generally termed a deep, sound, black mould, made very deep by trench-ploughing or digging, and lying on an absorbent subsoil,

*Peppermint*.—Considerably more than 100 acres of this herb are grown in the parish of Mitcham. In the culture great attention and labour are requisite: the ground

Digitized by Google

ground must be made very fine and open to a considerable depth, by frequent ploughings, harrowings, and rollings; and the manure must not only be well rotten before it is applied, but worked well with the soil. This herb requires the constant use of the hoe, in order to keep the soil open, and prevent the weeds from rising among it; as they would not only retard its growth and make the crop thinner, but also injure it for distillation, unless they were carefully gathered out.

Before the winter sets in, the mould from the alleys between the beds is thrown over the plants, in order to prevent the frost from injuring them, as they are apt both to be thrown out of the ground and to be killed, if the weather prove severe. From the tenderness of this plant, when exposed either to very wet or very cold weather, it is found necessary to replant one-third of the whole crop every year: in other words, it cannot be reckoned upon as lasting more than three years.

The expense of cultivating this crop is very great; each hoeing, of which there are seldom fewer than six, costs from 6*s*. to 7*s*. per acre; and the throwing up the mould before winter, one guinea per acre, besides the expense of renewing the plants every third year, and the cutting of the crop.

It is very difficult to fix the average either of the price or of the produce per acre; as the former varies from 3*l*. to 10*l*. per ton, and the latter from two tons to six per acre.

This herb, as well as many of the others, is prepared by the growers in general; sometimes, however, they are sold to the druggists on the ground, or after they are cut.

The demand for peppermint would not be nearly so great as it is, if the use of the water were confined solely to medicinal purposes; but it is well known that in London, by far the most considerable part of it is drunk as a dram.

*Lavender.*—The seed of this plant is sown on rich and well-prepared ground in the spring; and in April the following year, the plants are set in rows two feet from each other. During the summer, the ground is carefully hoed and weeded; and in the autumn, the plants are pruned and trimmed. Before the frost sets in, the intervals are dug over; and every other year 20 loads of rich well-rotten dung are laid on, and pointed in, per acre.

Some of the flowers are bunched, and sold; but the greater part of them being intended for lavender-water, are thrown loose into mats, and thus carried to the still-room. The expense of cutting the lavender is about one guinea per acre.

*Wormwood.*—This herb is planted in rows, about two feet from each other, and requires to be kept very clean while it is growing. During the winter, the ground is dug over, and the mould from the intervals is thrown up about the roots of the plants. It is found necessary to take up the roots every three or four years, and to cut off the weak or decayed parts before they are replanted.

The seed, which is the only part of the plant used, is sold both to the druggists, and to the rectifiers of British spirits, at about 1*l.* 10*s.* per cwt.

*Chamomile.*—Two varieties of this herb are cultivated about Mitcham—the single, and the double; the former is principally bought at Apothecaries' Hall; the latter, by the druggists in general.

The

Google

The soil best adapted for chamomile is a dry sandy loam: the setts are planted about nine inches from each other, on beds four feet wide, with alleys of 18 inches between them. The culture is very similar to that of peppermint, viz. constant attention to weeding, principally with the hand; the digging of the intervals at the beginning of winter, and covering the exposed and loose roots of the plants with fresh mould.

A very wet summer is prejudicial to this plant, principally by weakening the flavour of the flower. It is sold by the pound, generally for about 1*s.*; and at that price, an average crop will pay nearly 33*l.* The expense of gathering such a crop will be about 3*l.*; the price paid being from 9*s.* to 10*s.* per cwt.*

*Anniseed.*—This plant requires a very rich mellow soil, prepared by being ploughed deep, or dug over once before winter, and again in the spring. As soon as ever the weather becomes mild and dry, the seed is sown; and to secure it effectually from the frosty mornings, by which, as being very delicate and tender, it is easily injured, a thin coating of dung is spread over the bed.

Great care requires to be taken to keep the crop clean, by hand-weeding and repeated hoeings. About the middle of August, the seed is generally sufficiently ripe to be gathered. It yields but a small proportion of oil—seldom more than half an ounce from a pound of seeds. Besides the more common and general use of this oil, there is, in the neighbourhood of London, a considerable demand for it by the distillers and rectifiers of British spirits.

---

* Aubrey, in his History of Surrey, says, that in his time (1673) chamomile grew naturally on a hill in the parish of Egham, which was thence called "Comomile-hill." (*Aubrey*, i. 165.)

*Liquorice.*—This root appears formerly to have been cultivated to some extent, on the warm, deep, and rich sands near Godalming; but at present it is confined entirely, I believe, to the parish of Mitcham.

Liquorice is well known to require a very rich and deep soil, as its roots frequently penetrate a yard, where the ground is naturally open and loose to that depth. It becomes therefore indispensably necessary to prepare the ground for it, either by digging it two-spade deep, or by trench-ploughing it, and afterwards by loosening the mould as much as possible. Sometimes it is even necessary to dig the ground three-spades deep. The dung is either put in before the ground is trenched, or immediately afterwards: in the latter case, it is well rotten, and pointed in with the spade.

When the ground is properly prepared, it is planted with shoots, taken from the heads and sides of the old roots; and in order to secure their growth, none are planted but such as have several eyes. The rows in which the liquorice is planted, are two feet asunder, and the shoots, from 15 inches to a foot and a half from each other. It has been proposed to extend the distance between the rows to two feet and a half or three feet, in order that the plough might be used between them. March is the most usual season for putting in the shoots.

Liquorice requires three years before it is fit to be taken up: this is done in November, by the spade, when the whole roots are washed, the fibres cut off, and the smaller roots separated from the larger ones. The former, termed the offal, are dried, and ground to powder;

Digitized by Google

powder; the latter form the principal article of profit, being packed up, and sold to the druggists.

The liquorice grown on the very rich black mould in the neighbourhood of London, is by some deemed not nearly so good as that which is grown on soils less full of manure: the appearance of the root, at least, is not so promising, being generally of a darker colour.

The weight of liquorice-root usually grown on an acre, varies from 18 cwt. to 20 cwt.: the price of the best roots is about 3*l.* per cwt.; and of the smaller roots, when reduced to powder, much the same. It costs 10*l.* per acre to take up the roots with the spade; nor is this an extravagant price, when the great depth to which they run, and the slowness of the operation, from the care not to break or leave any of them in the ground, are taken into the account.

Extraordinary crops of wheat (seven and eight quarters per acre are talked of) have been got on ground on which the liquorice has been grown. This has been ascribed to the depth to which the soil, during the taking up of the roots, has been dug; but it is not easy to perceive, how a plant with such a short root as wheat has, should have been so much benefited by the soil being loosened to such a great depth: the greatness of the crops may be attributed, with more justice, to the rich and clean state of the ground.

*Poppy.*—This is cultivated in the physic-gardens for the heads. It is not deemed necessary to plough the ground to an uncommon depth for this plant, nor to lay it up high; it should, however be made very fine, and dressed with a good coating of manure, well rotten and divided, and carefully mixed with the soil.

About the beginning of April, the seed is sown, at the rate of rather less than a pound to the acre. As soon as all the plants have made their appearance, they are thinned out by the hoe to the distance of about six inches from each other, and kept free of weeds till they begin to ripen. As the heads ripen at different times, there are generally three or four gatherings: as they are picked, they are put into bags, each holding about 3000 heads, and are thus sold to the chymists and druggists. Sixpence a bag is paid for gathering them; and the price of each bag, or 3000, is about 4*l.* 10*s.*

---

Besides the preceding physical plants, there are also grown, principally in the parish of Mitcham, the following, viz.: elecampane, rhubarb, medicinal soapwort, coltsfoot, vervain, angelica, rosemary, the damask and red roses, hyssop, horehound, marsh-mallows, pennyroyal, &c. &c.

The cultivation of these and other plants for the druggists, perfumers, &c. seems to be fast increasing in the parish of Mitcham, and to be extending itself to such parts of the neighbouring parishes as possess a suitable soil, and are sufficiently near London.

About the middle of the last century, there were a very few acres of physical plants in the parish of Mitcham; now there are upwards of 250 acres in this parish alone, besides nearly 100 acres in other adjoining parts of the county.

"We have some gardeners," says Mr. Malcolm, "who occupy several acres of land in the growth of such articles as daisies, wall-flowers, sweet-williams, primroses, violets, pinks, bachelor's-buttons, and the like; and insignificant as these articles may appear, yet it is wonderful the returns that are annually made in them.

"They are carried to the several markets in London, where they are exposed for sale in full blossom, and I am informed, meet with as ready a sale as any sort of vegetables. Indeed Mr. Shepherd, who lives in Horsemonger-lane, Southwark, and who was an old servant of my father's, has accumulated a considerable competency, and almost disdains the idea of carrying these things to market, having always a ready sale for them at home upon his own terms. Mr. Arthur Connor, of Mitcham-common, is a large grower; and it is no unusual sight to see three or four carts following each other, in the height of the season, from his grounds." —(*Malcolm's Agriculture of Surrey*, vol. iii. p. 134.)

## SECT. XXVII.—WOAD.

WOAD is sown on the chalk-hills in the neighbourhood of Banstead Downs, where it is found to answer remarkably well. The soil best adapted for it is a thin, and rather poor, chalky loam: it grows too strong on good land.

It is generally sown along with a crop of barley, on land which has had the preparation of a summer-fallow. In order to separate the seed, and to scatter it more evenly over the surface, it is usual to mix it with ashes: rather less than a pint is allowed to the acre.

There are two important circumstances which recommend the cultivation of this plant.

In the first place, it is found to be a very good preparation

paration for wheat on the thin soils, where it is commonly grown; and

Secondly, as it is ripe very early in the summer, it can be sold, and the money for it got in time to help to pay the expense of the corn harvest.

It is generally ripe in July, when it is pulled and bunched.

Digitized by Google

# CHAP. VIII.

## GRASS LAND.

IT has already been remarked, that the county of Surrey has a much smaller proportion of grass land than Middlesex, and, indeed, than most other counties in England. It is however thought by many of the farmers, that grass land is rather on the increase: this, at least, is certain, that there are several very powerful causes operating to reduce the quantity of arable land.

If these causes proceeded solely or principally from the conviction and experience, that many parts of Surrey now under the plough, would be much more productive if laid down to grass, the country would have just reason to rejoice at the increased knowledge and overcome prejudices of the farmers, and at the prospect of superior cultivation and increased produce. But it is apprehended, that the tendency and desire to convert the arable land into grass, arise principally, and in most instances, from causes of a quite different description, and which, neither from the source from which they spring, nor from the effects they are likely to produce, are such as promise much advantage to the country.

It cannot be denied, that a county entirely in tillage, or nearly so, is in as improper a state as one entirely under grass; and that the perfection of modern husbandry

Digitized by Google

husbandry consists in the due proportion between the land in grass and the land under the plough. So far, therefore, as the causes which are prompting the Surrey farmers to convert their arable land into meadow or pasture, of whatever nature they may be, tend to bring about the proper balance between the two different methods of occupying land, their effect must be considered as beneficial; but if, as there is too much reason to suspect, this tendency to lay down the arable land proceeds from other causes, than the conviction of the superior eligibility of the mixed or convertible husbandry, there is great danger, both that it will be carried to too great a length, and that instead of making grass subservient to tillage, the land will be laid down permanently in grass.

There are evidently two, or perhaps three causes, operating in Surrey to diminish the quantity of arable land, independently of the conviction that grass ought to be more generally introduced, in order to refresh and recruit the land which has been so long under the plough.

In the first place, the very great increase, within these few years, in the expense of managing arable land, certainly operates very powerfully and generally. When the increase in the wages of ploughmen, and in the price of ploughs, harrows, &c. and of horses, besides the increased expense of harvesting and thrashing the corn, are considered, it ought not to be wondered at, if the farmer preferred a mode of occupying his land, in which he would be freed from this enormous expense.

The very great rise in every thing connected with an arable farm, operates two ways: it makes the farmer already in possession of a farm, anxious to get his land into grass as speedily as possible; and it makes the farmer who is looking out for a farm, give a decided preference to land already in grass, or which may be converted into grass with the least delay, risk, and expense.

In the second place, there is another cause operating, closely connected with the preceding, or rather perhaps, to speak more correctly, a part only of the preceding. There are several farmers who, notwithstanding the high price of every thing connected with an arable farm, yet prefer *it* to grass land, but who are obliged to lay their land down to grass, from the extreme difficulty of procuring a sufficient number of labourers at any price. The difficulty of procuring hands is complained of in many other parts of the kingdom; but, from causes so very obvious, that they need not be pointed out, and so very powerful that they cannot be overcome, this difficulty operates in the highest degree in the neighbourhood of the metropolis.

It may indeed be contended, that things will naturally, and of themselves, soon find their proper level; and that the very circumstance of the arable land being converted into grass, will necessarily give up sufficient hands for the remaining tillage land; that the conversion cannot possibly proceed beyond a certain point, when, from the diminished supply of corn, and the diminished demand for labour, the profit of arable land will equal that of grass land, and a want of hands no longer be complained of. If Surrey were situated like many other counties, far removed from the metropolis, which presents an almost inexhaustible demand for labour, this might be the case; but situated as it is, it is highly probable that the complaint of want of hands will increase instead of diminishing, even though half the land at present under the plough, were laid down to grass.

In the third place, the dislike, not to say antipathy, to tithes, is so great, that any mode of occupying land which will free the tenant from even a part of his trouble and vexation on this head (where taken in kind), will be resorted to, provided it will pay nearly as well as tillage. It may be urged that the dislike to tithes, if it really were a cause of any weight on this point, must have operated to nearly as great an extent formerly as at present; but it should be recollected that, in the present times, much greater knowledge, skill, enterprise, and capital, are to be found among the farmers, and, from the great increase of rent and expense, a much greater and more general necessity of exerting and laying them out on the improvement of their lands; and of course, tithes are now felt more acutely than formerly, when very few improvements were executed.

It is perhaps fortunate, that these causes, which certainly are producing a certain, though slow and silent effect, in many parts of England besides Surrey, are here in some degree counteracted by a pretty general, and, where it does exist, a very deeply-rooted opinion, that this county is not suited for grass. It is difficult to say, whether this opinion is the result of experience, of prejudice, or of both in some degree: the extreme dryness of the climate certainly favours it.

Still, from the effect produced by the opposition of this opinion, whether it be well-founded, or a mere prejudice, to the causes already noticed, we cannot expect that due and exact proportion of arable and grass husbandry which constitutes the perfection of agriculture, nor the appropriation of the different parts of the county principally to the one or the other, according as their soils, climate, and situation required. Necessity cannot, and prejudice will not, make that choice, which can only be expected, where superior skill and experience can act completely unfettered by external circumstances.

## SECT. I.—MEADOWS.

By far the greater part, and the most valuable of the meadow land in this county, lies along the banks of the Thames, in the north-western division; in the parishes of Oxted, Tanridge, Lingfield, Crowhurst, in the south-eastern division; on the banks of the Mole, near Cobham; and on the banks of the Wey, near Godalming. There is also some meadow land in the north-eastern division of the county, near the metropolis, about Dulwich and Camberwell, and a little near Petersham, Wandsworth, and Streatham. A few acres are scattered over most other parts of the county; but the proportion both of meadow land and of pasture is least in the Weald, where, from the naure of the soil, and the expense and difficulty of tillage, most grass land would naturally be expected.

Where the meadow land is not flooded artificially, or by the natural overflow of the rivers, it is regularly dressed, either every year, or once in two years, with a very large coat of manure. When the expense of this manure, and the withdrawing such quantities of it from the arable land, are considered, and the quantity of hay generally got from an acre of meadow land thus dressed, is also taken into the account, it may

justly

justly be regarded as comparatively very unproductive land.

Upon the richest meadow land, it very seldom happens that more than two tons and a half of hay are got, even in a favourable year: two tons, and one and a half, are much more common. On the less fertile meadows, especially such as are *upland*, not more than a ton and a half of hay is often cut, and frequently only a ton. The quality of the hay varies very much in different parts of Surrey. About Chobham and Bagshot, the meadow-hay has a very fine colour, and, to all appearance, is very excellent hay; but it has been proved by the experience of almost every regiment of cavalry which has been quartered at Guildford, and which, from the appearance of the hay, has been tempted to purchase it, that it possesses very little nourishment; and that in fact, it is much inferior to the hay that is grown on the meadows near Cobham, though the latter does not look nearly so good.

This curious fact is attributed, and probably with justice, to the different nature of the waters at Bagshot and Cobham: near the former place, the water is evidently very strongly impregnated with *iron:* this must injure the hay: whereas, about Cobham, the water from the Mole is as evidently calcareous; this probably is beneficial to the hay.

Both the hay and the pasture of the meadows near Godalming, are frequently much injured by the sand brought down and deposited upon them by the Wey.

If the meadow lands near Egham, comprising Runnymead and the Long Mead, were in severalty, and proper measures taken to flood them at proper seasons by means of the Thames, they probably would be by far the most valuable in the county, as the soil is a strong clayey loam, of considerable depth. At present, the meadow land on the banks of the Mole, near Cobham, of a soil equally good, and nearly similar to that of Runnymead, may justly be regarded as the best.

The rent of the best meadow land, such as that of Cobham, is *3l.* per acre; the other meadow land in the county runs from *40s.* to *50s.* per acre. In forming this average, the meadows near London are to be excepted, as, from peculiar and extraneous causes, their rent is much raised above what it otherwise would be.

* * *

## SECT. II.—PASTURES.

PERHAPS the greatest extent of pasture land lying altogether, is to be found on the Duke of Norfolk's estate, in the parishes of Newdigate and Charlwood, in the Weald of Surrey. On this estate, cattle are taken in to graze, from the beginning of May to the beginning of October: the price paid per week depends upon the size of the cattle: the smallest size pay *1s. 6d.*; the largest, *2s. 6d.* per week. The land is generally stocked at the rate of one ox to each two acres; but as there are, almost every week, some taken out, and others put in, it is not easy to ascertain precisely what number per acre the land carries through the summer.

In a county like Surrey, which possesses scarcely a single farm which has been exclusively in grass for any number of years, there can be nothing interesting or new with respect to the management of pasture land, except so far as regards it during the time it is bringing into a proper condition: this, however, will fall more properly to be considered hereafter.

With regard to dairy grounds, there may be said to be none in Surrey; though there is reason to believe, that at least a small part of the butter consumed in London was formerly supplied by it, at a time when the access to the metropolis from more distant dairy lands, was not so easy and expeditious as it is at present. The following passage, from Aubrey's History of this County, certainly countenances this opinion, and also gives some curious information about the attempts, in his time, to make cheese here.

Speaking of the parish of Warplesdon, he says:

"The cheese of this, as well as some other parts of this county, is very bad and poor: they rob their cheese, *by taking out their butter for London;* and they are miserably ignorant as to dairy (except for butter).

"A gentlewoman of Cheshire, married into these parts near Albury, and misliking the cheese here, sent a dairy-maid out of her own country; but she could not, with all her Cheshire skill, make any good cheese here.

"But Joseph Shakespeare's wife (Mr. Blanchard's house-keeper, and an excellent housewife, whom he brought with him from North Wiltshire), makes as good cheese here, as ever she did in her own country, viz. that sort of cheese which is called in London Marlborough cheese, about one inch thick; and tells me, it is only want of art."—*(Aubrey's Natural History of Surrey,* vol. iii. *Warplesdon Parish.)*

It may be proper to mention, that Aubrey collected the materials for his History in the year 1673*.

## SECT. III.—LAYING LAND IN GRASS.

No complaint is more general among farmers, than than that it is in all cases very difficult, and in some cases nearly impracticable, to lay land in grass. This difficulty is felt and acknowledged in Surrey; and some of the more active and enlightened of the farmers there, have endeavoured to remove or obviate it, by pursuing a different method of laying down land, from that which is generally practised.

Before proceeding to detail the principal points to which particular attention ought to be paid, by those who wish to get a good and lasting sward on their old arable land, it may not be improper to state more precisely the nature of the difficulty complained of, and the circumstances and soils in which it is found, by experience, to operate most powerfully.

It is found that land, when laid down to grass, in general produces a good crop, and presents an equal and pretty close sward, for three years; in some cases, the grasses continue to cover the ground for nearly five years: after that time, they begin evidently to disappear; and till the grasses natural to the soil spring up, and occupy the place of the artificial grasses, there is a thin and unequal sward.

This is found to be more particularly the case, where red clover and ray-grass are the only or the principal seeds used to lay down the land with; nor is the white clover much more permanent. It is perhaps difficult to assign the cause of this, in cases where every justice has been done in preparing the land by repeated tillage and a good coat of manure, and where the young grass has been treated with every possible care and attention. It cannot be denied that, in most cases, the failure is owing in a great measure to improper management; but as it is found to take place where no inattention, or injustice to the land, are justly chargeable, we must look to some other cause.

---

* The sheep-pastures will be considered under the head *Downs.*

The circumstance, that natural grasses in many instances rise up, and occupy the ground previously covered with the artificial grasses, will probably, if thoroughly considered, and viewed in its proper light, lead us to a sufficient and satisfactory cause. The stock of our artificial grasses is at present very scanty; at least, there are few used, when it is intended to lay land into permanent pasture, except white clover, ray-grass, and rib-grass. Now from the slightest examination of natural grass land, in commons, and by the sides of the highways, we may be convinced, that almost every variety of soil and situation has its prevailing grasses. Many, no doubt we find common to almost every soil and situation—some common to many; but still there are not a few which are either confined to particular soils and situations, or which, if found in other places, appear to be, as it were, strangers to the soil in which they grow, and are not nearly so healthy and vigorous as plants of the same kind, found on a more genial and favourable soil.

If therefore the grasses usually sown, do not find their natural soil and situation, we need not be surprised if they languish and perish; or if those of them which were found on other soils to be perennial, now fail in the course of three or four years. This we might naturally expect to be the case, even if the grasses, after they grew, had no enemy to struggle with, but a soil and situation unsuitable to their *kind:* but this effect will be brought about much more generally and completely, whenever the seeds of those which are natural to the soil, spring up and struggle with the stranger grasses.

It may indeed be alledged, that the natural grasses do not make their appearance till the artificial grasses have lost their hold and begun to decline. This probably is the case, but the occupancy of the soil by the native grasses, must serve to render the sown grasses still more weak, and to hasten their total decline.

The following observations, from Mr. Morris Birkbeck, of Wanborough, in this county, deserve attention, as proceeding from a man of an active mind, and an able and successful farmer.

" Old grass land is universally distinguishable from old arable by a stratum covering the original soil, composed of living and dead vegetable fibres, the remains of decayed vegetables, and a portion of earth intermixed, varying in quantity according to the nature of the soil and of the plants which form the turf; and containing abundance of the seeds of those plants, in a dormant state, but always ready to vegetate when placed in circumstances favourable for that purpose.

" Of the existence of these seeds, where they have not been destroyed by abortive vegetation, as in old arable land, there can be no doubt, unless we admit the equivocal or spontaneous production of plants: but to establish the fact by direct proof, I caused two portions of turf, one from a loamy soil, the other from chalky down, to be carefully washed; and though it was with difficulty the minute seeds could be extricated from the mud and small fibres, a variety of species were discovered in complete preservation.

"Until agriculturists shall have at their command the seeds of the valuable pasture grasses, as they have at present those of clover, ray-grass, &c. they must rely, for the reproduction of turf, on those which are locked up in the vegetable stratum of all old grass land.

"A field of old turf of fifteen acres, strong loam, was broken up by the plough; and after a good summer, laid down again the next spring with ray-grass and trefoil: these by the third year were nearly extinct, and the natural grasses had re-established themselves completely.

"Eight acres, part of an adjoining field of old tillage, similar as to soil, was laid down without seeds. This acquired a turf as speedily as the former; but it was principally indebted to a single species, the *agrostis stolonifera*, or black couch, a circumstance which I expected and wished for; the habits of this plant being singularly adapted for water meadow, which was my object; having relied solely on the *agrostis stolonifera*, for the formation of a turf for the purpose of irrigation. I think it right to add, that the effect has exceeded my most sanguine expectations: where the water has had its due effect, it would be difficult to distinguish it from old meadow of very superior quality, though it is only a year and a half since it was laid down.

"I have also made a similar experiment the last spring on a field of five acres, which was full of the *ranunculus repens*. Ten pounds per acre of perennial clover and one quarter of hay-loft seeds, containing abundance of Dutch clover, were sown with barley. It is now under water, and the *ranunculus repens* promises to form the basis of an excellent turf. Arable lands are frequently foul with the roots of this plant, and when such are under preparation for grass, pains are taken to destroy it, which is injudicious; for though a noxious weed among corn, it is of great value in pasture.

"Perhaps there is no way in which the Board could more effectually promote the interest of agriculture, than by a proper encouragement of the cultivation of natural grasses and other plants, which compose the herbage of the best old pastures.

"We are already in possession of the seeds of several plants of great value in the formation of perennial turf, viz. ray-grass *(lolium perenne)*, perennial clover or marsh grass *(trifolium pratense)*, Dutch clover *(trifolium repens)*, rib grass *(plantago lanceolata)*, meadow soft grass *(holcus lanatus)*. If to these were added meadow fox tail *(alopecurus pratensis)*, meadow fescue *(festuca pratensis)*, and a few more species whose particular habits have not as yet been sufficiently studied, we might by a liberal use of a suitable mixture of these seeds, command valuable grass land in many vale countries, which have been injudiciously continued under course of aration, to the impoverishment of the occupiers and the public loss*."

With respect to the circumstances in which the greatest difficulty or want of success is found, in attempting to lay down land to grass, they will be found to be exactly such as we should have expected, after being made acquainted with the fact already stated; viz.

---

* Communications to the Board of Agriculture.

Google

viz. that there are in most soils the seeds of the grasses natural to them, lying in a dormant state.

Let us suppose that grass-seeds not suited to the soil, are sown in any particular field: if the seeds of the natural grasses abound and lie near the surface, they will vegetate, and thus produce plants to supply the place of the artificial grasses, as they decline and wear away. But if there are few or no seeds of the natural grasses, lying within the action of the manure or atmosphere, in that case the ground will be left nearly bare and unoccupied, after the sown grasses have disappeared: for though it is contended that the natural grasses in some degree help to banish the sown grasses, it by no means follows, that the latter would have remained and flourished permanently, if the seeds of the former had not existed or not vegetated.

Now it is well known, that a long continued course of tillage has a necessary tendency to destroy the vegetative powers of the seeds near the surface; or to make them spring up, and thus to lessen their number: and we accordingly find, that land which has been very long in tillage, is much more difficult to lay down in good and permanent pasture, than land which has but lately been broken up from grass, though if a sward can be got on the former, it will produce more than the latter.

Thus the difficulty appears to be increased in proportion to the necessity and advantage of the operation: in order to *refresh* the old arable land, and at the same time to supply its place by breaking up the old grass land, it is often deemed expedient to make an interchange; but if the extreme hazard and difficulty of getting permanent pasture from land which has been long under the plough, cannot be obviated, this conversion

Digitized by Google

version cannot take place to the extent, and in the cases in which it would be most desirable and most advantageous.

The only mode of obviating this difficulty, and thus of enabling the farmer to change his tillage land to grass with as much ease and certainty as he now intermixes his crops of corn, is certainly that suggested by Mr. Birkbeck, in the Communication to the Board of Agriculture, already quoted. When the grasses proper or peculiar to the different soils and situations, are well ascertained, and as thoroughly known, and as much at the command of farmers, as clover and ray-grass are at present, then there will be no difficulty in laying down the oldest tillage land in good and permanent grass, provided the soil be properly prepared, and the pasture, while young, be judiciously treated.

*Preparation.*—On this head there is no difference of opinion among the Surrey farmers, however some of them may fail to reduce their rules to practice.

In order to give the grass seeds a fair chance of succeeding, the land should be made very fine and clean: if it be foul, and occupied by the roots of weeds, it is in vain to expect that the small and tender seeds will be able to thrive or live long: even if they should succeed in gaining a footing, still from the great mixture of weeds, the ground, whether it be intended for hay or pasture, will be of little value. It is no less necessary that the soil be well pulverised than that it should be made very clean: the grasses cannot *forage* so well as corn: they cannot push their tender and delicate roots with so much force nor to so great a distance: of course the land cannot be made too fine when grass seeds are to be sown.

Hence, the necessity of a summer-fallow or a fallow crop, as a preparative for grass-seeds: light lands, especially if they lie on a wet subsoil, cannot be made sufficiently clean to be laid down, unless they are well worked during the summer; and strong soils cannot be made sufficiently fine for the same purpose, without a summer-fallow.

It is no less necessary to drain and lay dry land intended for grass: no doubt can be entertained on this head if it be meant for pasture; and if it be intended for meadow, there can be no dependence on the quality of the hay unless the field be well drained, for the sour and unwholesome grasses will soon root out the sown grasses, wherever the latter have to struggle with a cold and wet soil. The practice of watering meadows, and the success attending it, may appear to be inconsistent with this rule: but it should be remembered, that there is a very great difference between water at command, which can be let on the field only in such quantities, at such seasons, and for such a length of time as are deemed proper and beneficial, and water constantly on the surface, and probably in the greatest quantity when it is most prejudicial.

On the application of manure there is some difference of opinion: some think it best to manure the land highly during the summer-fallow; while others prefer giving it but a slender dressing at that time, and repeating the application of manure to the grass more frequently. There is one evident advantage attending the latter mode, which is not attained, or rather counteracted by the plan of dressing the land, while under fallow with a large quantity of manure. By applying most of the manure as a top-dressing, the finer grasses whose roots lie near the surface, gain a superiority over the coarser and deeper rooted grasses: their growth is encouraged, and they stand a fair chance of forming a close and thick sward, to the exclusion of the less profitable sorts. But if the manure is applied to the fallow, and consequently buried to a considerable depth, the roots of the coarser grasses alone can reach it: they will therefore thrive vigorously, and smother the more delicate sorts.

*Time of Sowing.*—This is chiefly determined by another circumstance, about which there is a difference of opinion among the Surrey farmers; viz. whether the grass-seeds ought to be sown along with a crop of corn, or by themselves.

The opinion of some of the most intelligent and experienced farmers, is certainly inclining to a preference of the plan of sowing grass-seeds by themselves. The frequent failure of them, when sown along with corn, would naturally lead the mind to the inference, that they were injured by the corn; and this inference would be strengthened by reasoning as well as apparent experience.

The two most obvious and powerful reasons for supposing that grass-seeds will not thrive so well when sown along with corn, as when sown by themselves (which of course would lead the mind to attribute their actually not thriving when thus sown, to the corn), are, that the corn must deprive the grass-seeds of part of the nourishment they would otherwise receive, and also injure the young grass by an intermixture of roots: and that if grass-seeds sown along with corn do not appear to be thriving, there is no opportunity of manuring them till the corn is off the ground.

With regard to the alledged fact, that where grass-seeds sown along with corn do not thrive, it is owing to the corn; and the reason assigned, that the corn injures the grass by drawing off part of its nourishment, and by the intermixture of roots, it may be remarked, that if the alledged fact rests on no better basis than the reasons assigned, it is not very well grounded. It *may* be a fact, that grass-seeds are injured by being sown along with corn: but the mere coincidence of their failure occasionally with their being thus sown, certainly does not prove that the corn is the cause of it: and, as was before remarked, the reasons assigned do not make up for the defective evidence.

In the first place, it may be allowed that there would be more nourishment for the grass-seeds if they were not accompanied by the corn; and yet there may be still quite as much nourishment as is necessary for them when they are thus sown. The manure must be very exactly proportioned to the crop, if there do not remain, after the corn is supplied with what it needs, amply sufficient to satisfy the trifling demands of a young crop of grass.

In the next place, the roots of corn and of grass in their first year, are not very likely to interfere so as to retard the growth of one or both. In fact, the failure of grass-seeds among corn, is in most instances clearly and undoubtedly attributable to a very different cause: viz. to the too great luxuriance or to the *lodging* of the corn, by which, of course, the seeds or young plants of the grasses are choked and destroyed. Many cases no doubt occur, in which the grasses fail, though the crop of corn is not strong or smothering, but there is no reason to suppose that the corn was the cause of the failure in these cases, or that the grasses would have succeeded if they had been sown by themselves; at least, there is not the slightest ground for believing that the corn injured the grasses, either by robbing them of their due and necessary nourishment, or by the intermixture of roots.

Notwithstanding, however, the reasons just examined appear not to have much weight, yet perhaps, upon the whole, it would be better to lay down grass without a crop of corn; as, if the land be properly prepared, there is too much reason to fear such a luxuriant crop as will materially injure the grass-seeds.

*Seeds.*—The seeds most commonly used are white clover, trefoil, ray-grass, rib-grass, and the Yorkshire grass, or meadow soft-grass *(holcus lanatus)*. Some of the Surrey farmers who have paid considerable attention to the natural history and particular habits of the grass tribe, have sown a mixture of crested dogs-tail *(cynosurus cristatus)*, meadow fox-tail *(alopecurus pratensis)*, and meadow fescue *(festuca pratensis)*, with very great success*.

*Management first Year.*—The mode preferred is to pasture the new grass lands the first year with sheep; but in too many instances they are cut for hay, and thus the more delicate and shorter grasses are often smothered under the coarser and taller kinds.

*Manuring.*—This is judiciously and carefully attended to by many farmers, while by others it is either neglected, or conducted in such a manner as to defeat the end in view. The greatest, though perhaps not the most common fault on this subject, is to lay on the manure in such a cloddy, unbroken state, as to do little good to the plants, and to expose it to be in a great degree wasted before it can be mixed with the soil.

---

* Mr. Drewitt, of Send, in particular, has laid down a field with these grasses, with great judgment and success.

On the quantity of manure for new lays, the following directions are given by Mr. Birkbeck, of Wanborough.

" Turf may be restored to its former fertility; and for this purpose it is only necessary to observe one simple rule, viz. let manure equal to the whole exhaustion incurred during the course of tillage, be replaced on the grass. To ascertain this, an accurate account should be kept of the straw and grain produced by each crop. The same weight of grain and oil-cake consumed by horses, cattle, or hogs, littered on an equal quantity of straw, will furnish an equivalent in manure sufficiently exact for our purpose.

" Had due attention been paid to this circumstance, the plough needed not to have been so scrupulously excluded from our old pastures. In fact, this is the essential point*."

There can be very little doubt with those who have considered the subject attentively, that the rule laid down by Mr. Birkbeck is of essential importance, and if it were carefully and accurately attended to, it would go a great way towards restoring a good and permanent turf on land laid down to grass. There seem then to be four principal points to be attended to, before the farmer can justly expect to succeed generally, in laying down to grass.

In the first place, every justice should be done to the land, in cleaning it thoroughly during the course of the previous summer-fallow; in reducing it to a fine and even tilth; in freeing it from all springs, and as much as possible from surface water; and in laying on a *due quantity* of well rotten manure, and mixing it intimately with the soil, taking care at the same time not to bury it to such a depth that the roots of the finer grasses, of those grasses which principally form a close and even turf, will not be able to reach it: while on the contrary, the deeper roots of the coarser grasses gaining all the benefit of it, would spring vigorously, and choke the more delicate and less favoured plants.

---

* Communications to the Board of Agriculture, vol. iv. p. 137.

In the second place, a more scientific and extensive knowledge of the respective grasses peculiar or proper for every kind of soil and situation, ought to be attained by the farmer: the mere introduction of the best grasses into the seed shop, will do little, even if we suppose that the seedsman knows to what particular soil each kind is best adapted; for many important mistakes will arise, if the farmer depends entirely upon the general advice of the seedsman for the choice of his seeds: or if, on the other hand, the seedsman depends entirely upon the description of the soil for his recommendation of them. If the farmer carefully examines the grasses which flourish best on the natural sward near his farm, and ascertains which of these are most relished by his particular kind of stock, and at the same time afford most nourishment, he might, if he were possessed of the requisite botanical knowledge, select from the shop of the seedsman, the exact grasses which he knows suit his soil and situation, and which he has found most grateful and nourishing to his cattle.

In the third place, let us suppose the ground well prepared, and such grasses sown as there is every reason to suppose, from being naturally suited to the land, will keep their hold, and in time form a close and healthy sward: it should be deemed an essential point not to stock the new grass heavily; *i. e.* neither to put cattle on it at first, nor even to put a great number of sheep; and always to put on sheep in preference to cattle in the spring of the year, when the plants are tender and their roots have not yet got *resettled* in the soil, after the winter's frosts. If it be necessary to be cautious not to overstock the land, the practice of cutting it for hay the first year ought to be still more cautiously avoided. This is a certain method of impoverishing the land, and of giving the coarse grasses a great advantage over the finer sorts.

In the fourth and last place, great attention should be paid to the land, even after the turf is completely and regularly formed. Many farmers seem to think that grass land needs no attention after the plants are once established, and that if they only manure it well if it is cut for hay, or do not overstock it if it is depastured, it will continue to thrive, and even improve. But there are other points on which the farmer ought to be careful: the roller ought often to be used: this will encourage the finer grasses, and prevent the land from becoming mossy: the ant-hills should be levelled and spread before they gain an extensive footing; but above all, the *drains* ought to be constantly kept in the best repair, and no water suffered to lodge on the ground. Whenever it becomes very mossy, and the best grasses are giving way very generally and rapidly to *weeds*, the shortest, most effectual, and least expensive method, is to break up the ground, and after taking a few crops of corn and cleaning it well, to lay it down again.

## SECT. IV.—BREAKING UP GRASS LAND.

FROM the account already given of the agriculture of Surrey, it will be seen that there can be few instances of old grass land being broken up. In fact, this can hardly be considered as forming part of the agriculture of the county, the instances are necessarily so few, partly from the very small proportion of old grass land, and partly from the objection against breaking it up, operating here, perhaps with greater force, from the very small proportion of it, than in most other counties.

When grass land is broken up, paring and burning seems to be the method most generally practised. The preference given to this mode arises partly from the experience of its greater efficacy and profit, and partly perhaps, from its having been so very long practised in Surrey.

The time of its first introduction into this county is pretty well ascertained, from the following passage in a letter from the celebrated Mr. Evelyn, author of the Sylva, to Mr. Aubrey, who published a Natural History of Surrey towards the close of the seventeenth century. Evelyn's letter is dated 1675-6.

"The barren hills (near White Downs) formerly covered with a fine carpet of turf, have within these forty years been exceedingly improved by Devonshiring, as we call it, that is, by paring off, drying, burning, and spreading the swarth. Formerly they were full of sheep feeding on the wild thyme: now they are sown with corn, and maintained in heart with liming and other manuring. The mutton is small but very sweet. Wheat-ears do often frequent these downs."

Paring and burning is practised principally now as it appears to have been at first, viz. on new land never before under the plough: the process, therefore, expense, and advantages, will fall more properly to be considered in the Chapter on Improvements, Section the 2d. So far as it is practised on old grass land, I am happy to have it in my power again to avail myself of the observations and experiments of Mr. Birkbeck, of Wanborough, as they are detailed by himself in the 4th volume of the Communications to the Board of Agriculture, pages 59—62.

"Paring and burning is an operation so well adapted to the purpose of converting grass land to a temporary course of tillage, in every view of the subject, that I have no hesitation in proposing it as the first step, in all soils and situations; though I am aware that strong objections to the practice have frequently been made, and supported by plausible reasoning. After explaining the grounds on which I recommend it, I shall take some notice of these objections.

"Although good crops may occasionally have been obtained from newly-broken ground, the vegetable stratum, in its crude state, is not generally favourable to the production of grain, on account of the sponginess of its texture.

"By paring and burning, that portion of the turf which contains from three-fourths to four-fifths of the undecayed fibres, is at once converted into a substance the most favourable to vegetation, and the spongy quality is completely corrected, whilst not more than two inches in depth need be disturbed; thus securing in an effectual manner, the best preparation for grain, and the means of the restoration of the turf.

"Objections lie against this practice, from the supposed waste of vegetable matter; and some persons alledge, that the soil itself suffers diminution.

"The latter opinion is not entertained by those who are aware of the refractory nature of earths in general; and the former will probably lose much of its weight, when it is considered that the fixed principles of plants, which are the result of combustion, carbon, phosphate of lime, and fixed alkali, are speedily converted into vegetable nutriment; and that it is only by combustion, or a slower decomposition, which also suffers the volatile parts to exhale, that this change in the vegetable fibre can be effected: therefore the competition in bulk, supposing that the criterion is not between the ashes of burnt vegetables and the vegetables in a perfect state, but between the ashes and the result of this slow decomposition, when as nearly approaching to vegetable nutriment. A great reduction takes place even in rotten dung, before it is fitted to enter the vessels of plants; and in the comparison, the value of the time saved should be thrown into the scale. That something is lost by this process to the particular field, the volumes of smoke which are seen rolling over the hedges, plainly testify; but as this is principally water, coloured by a small portion of oil, it is probably of less importance than the carbon which escapes in gas, when the combustion is complete. The same effects are also produced by fermentation. If dry straw be burnt in the open air, a very large proportion is dissipated; but it is otherwise with the roots of grass collected in heaps, and enveloped with earth. The loss in this case is less considerable, as a great part of the plant is merely converted into charcoal. From comparing a quantity of straw with the remains after combustion, I was long of opinion, that to burn a vegetable which might be converted into manure, was the extreme of prodigality; but facts occurred which it was impossible to reconcile to this theory, and which compelled me to a different view of the subject; some of these I shall relate.

"Two fields, making together about 50 acres, were laid down in an exhausted state. When they had acquired a turf, one received a summer and winter's fallow, the other was pared and burnt; and both were sown with barley and seeds. The effect was strikingly in favour of the latter, both in the barley, and the seeds which followed.

"Another field of the same quality, 22 acres, was pared by the plough in the spring of 1799, and about half of it was harrowed repeatedly during the summer: the wetness of the season prevented the burning; but as the turf was completely killed and much broken by the harrow, this part of the field became a good fallow. The remainder, not being disturbed, set again; and the following spring, was nearly as green as before. In the succeeding summer, the operation of burning was thoroughly performed: where it had not been previously broken by the harrow, the entire turf, down to the chalk, was subjected to the fire; and in the other, though nearly decomposed by two years' fallowing, enough was burnt to produce a tolerable sprinkling of ashes to stimulate vegetation, if that were their property. This field affords a fair opportunity of deciding betwixt the two modes of reducing old turf to tillage. I ex-

I expected that, in this instance, fallow would have taken the lead by the help of the ashes; but in the turnips now growing, the odds are very much in favour of the pared and burnt land. A stranger would be struck by the difference; and unless the succeeding crops, and future condition of the land, should be different from the present appearances, all doubt, in my mind, as to the effect, will be at an end.

"I have had proofs equally decisive, on clay and loam, of the preference of paring and burning to fallowing, and to sowing on the fresh turf; but have never had occasion to observe the impoverishment from the former, which I had suspected: indeed the reverse has in every case been so obvious, as to amount, in my judgment, to very strong evidence, if not to demonstration.

"I believe, that if the crops on equal quantities of land subjected to these different processes, were accurately weighed for two, or perhaps three, years, it would be found, that the produce of the pared and burnt land would exceed that of the fallowed by more than the whole amount of the turf consumed. This might be submitted to experiment; and if proved to be so, the only formidable objection to this operation would be done away. Should not this extraordinary produce be replaced by manure, the soil will no doubt suffer exhaustion; as would be the case, in proportion to the crops obtained, under any kind of culture.

"If plants are suffered to decay on the spot where they grow, they repay with interest the soil which supported them: witness the vegetable mould which covers the earth, in all situations undisturbed by the plough. Thus, when a crop is expended on the field which produced it, the field is enriched: and the larger the crop, the greater the acquisition. Taking the quantity of vegetable matter as the criterion of fertility, land which has been pared and burnt will probably, at the end of the third year, if managed on this principle, possess it in a higher degree than fallowed land; with this additional advantage, that, during the three years, a much larger proportion of vegetable matter will have undergone the change which agriculture is intended to effect.

"It is not perhaps impertinent in this place to inquire, how an accumulation of matter so dense may be acquired from the atmosphere?

"The carbonic acid gas is probably a powerful agent in the growth of plants: they may be indebted to the decomposition of this gas for a part of the oxygen which they exhale, and of the carbon which constitutes the vegetable fibre, and becomes the substance in question on its decay. The proportion of carbon in this gas is to that of oxygen, nearly as 12 to 57. Thus the existence of carbon in the aeriform state is acknowledged; likewise an increase of soil, consisting principally of this substance, produced by the growth and decay of plants. The decomposition of the carbonic acid in the process of vegetation, may have been proved: I offer it as a conjecture.

"It seems clear, that the acquisition, however obtained, will be as the quantity of vegetation; therefore land which has been pared and burnt, producing larger crops, will acquire more than fallowed land, to compensate for the loss sustained in the process.

"I conceive it unnecessary to describe the operation, it being well known in most parts of the kingdom.

Workmen who understand it, are in the habit of travelling to a distance for jobs: such should be engaged; they will perform the work better than strangers to it can, with the best directions, and the labourers of the neighbourhood may acquire the practice from them."

Digitized by Google

# CHAP. IX.

## GARDENS AND ORCHARDS.

### SECT. I.—GARDENS.

IN drawing up a Report of the Agriculture of a county in the immediate vicinity of the metropolis, I found that Mr. Middleton, in his account of Middlesex, had anticipated most of the facts and observations relative to the subject of this Section, which presented themselves to my view. Had these been of a nature strictly *agricultural*, and of course, such as might have been of importance and service to the generality of farmers, I should have considered myself as bound to have stated them, though my statement had been little more than a repetition of Mr. Middleton's; but, as what is common to him as the Agricultural Reporter of Middlesex, and to me as the Agricultural Reporter of Surrey, relates to subjects that affect and interest the gardener and nurseryman much more than the farmer, I have introduced merely some general remarks on them, and noticed a few points, on which Mr. Middleton's statements were silent or inaccurate.

I have been the rather induced to adopt this mode, because Mr. Middleton has treated on the subject of the gardens and nursery-grounds in the vicinity of the metropolis, with a fulness and accuracy that leaves very little to be added or corrected.

From the following passage in Fuller's Worthies, quoted by Mr. Lysons in his Environs of London, it appears, that gardening was followed with success in Surrey, soon after its first introduction into England.

"Fuller, who wrote in the year 1660, speaking of the gardens in Surrey, says, 'Gardening was first brought into England for profit about 70 years ago; before which, we fetched most of our cherries from Holland, apples from France, and had barely a mess of rath-ripe pease but from Holland, which were dainties for ladies, they came so far, and cost so dear. Since, gardening hath crept out of Holland to Sandwich, in Kent, and thence to Surrey, where, though they have given 6*l*. an acre, and upwards, they have made their rent, lived comfortably, and set many people on work. Oh, the incredible profit by digging ground! For though it be confessed that the plough beats the spade out of distance for speed (almost as much as the press beats the pen), yet what the spade wants in the quantity of the ground it manureth, it recompenseth with the plenty of the food it yieldeth, that which multiplying an hundred-fold more than that which is sown. 'Tis incredible how many poor people in London live thereon, so that in some seasons, the gardens feed more people than the fields*.'"

There is very little doubt, that the extent of garden-grounds near the metropolis has, like every thing else connected with luxury, increased much more rapidly, and in a much greater proportion, within these last 30 years, than in any preceding equal period; and Surrey seems to have had its share of the increase. The soil of most of those parts of Surrey which lie near London, especially of such as are peculiarly favoured in situation by their vicinity to the Thames, is well adapted to horticulture. Mr. Lysons calculates, that there are "5000 acres, within 12 miles of the metropolis, constantly cultivated for the supply of the London markets with vegetables, exclusive of about 800 acres cropped with fruit of various kinds, and about 1700 acres cultivated with potatoes. Besides which, there are perhaps 1200 more, cropped with various garden vegetables for the food of cattle, principally cows. This culture is carried on most extensively in the parishes of Camberwell and Deptford St. Paul's, by persons who are called farming gardeners. Their method is, to manure their land to the highest pitch of cultivation for garden crops, both for the market and for cattle; after a succession of which they refresh it, by sowing it with corn *."

---

* Lysons' Environs of London, i. p. 28.

*Rent.*—Mr. Lysons justly remarks, that there must be some error in Fuller's statement, with respect to the rent of garden-ground near London in his time (1660). Six pounds per acre, the sum he mentions, if we consider how very much the value of money has decreased since his time, appears an enormous rent. It may indeed be urged, with some appearance of probability, that the scarcity of garden-ground, the want of skill and experience in the gardeners, and the consequent inadequate supply of vegetables, would necessarily raise the price of them, and thus enable the gardeners to pay that high rent. If every kind of vegetable bore as high a price in proportion as the cauliflowers did in 1619 †, viz. 3*s*. of the money of that time, or 9*s*. of our present money for two of them, it is possible that there may be no mistake in Fuller's account.

---

* Lysons' Environs, iv. p. 575, 6.

† Lysons, vol. iv. p. 574.

At present, the rent of garden-grounds near London, runs from 6*l.* to 10*l.* per acre: within three or four miles of the metropolis, there is some garden-ground that letts as high as 12*l.* Garden-ground very near, is every year becoming more scarce, from the great demand for it for building upon; of course, the rent of such land for gardens bears a much higher price, than land equally good at a greater distance.

*Produce.*—Every kind of vegetable in demand at the London markets, is grown in the Surrey gardens; but some of them are particularly remarkable for asparagus. This vegetable is grown in great quantities, and of excellent quality, in the parishes of Mortlake, East Sheen, and Battersea; and every year the quantity is increasing. There are gardeners, or more properly farmers (for the extent of land they occupy gives them a just claim to the latter appellation), who grow near 40 acres of this vegetable. A great difference is observed, not only in the quality of the vegetables raised on soils of different kinds, but also in the seed gathered from them. The garden-grounds at Battersea, occupying a dry and kindly soil, are much famed for the seeds of the vegetables grown on them; and the gardeners at Clapham, and some other places in the neighbourhood, where the soil is less warm and dry, procure their seed from the former parish: in consequence of this demand for seed, much of the garden-ground in the parish of Battersea, is employed in raising vegetables for seed, many of which this way pay remarkably well. Radish-seed, in particular, is preserved in considerable quantity; and it is said that, in a favourable

able year, an acre of it will produce upwards of 40*l.* Onions are also cultivated for seed in the parishes of Mortlake and Barnes, but not nearly to so great an extent as in the parish of Deptford St. Paul's.

The following is an account of the quantity of garden-ground in some of the parishes in this county, in the more immediate neighbourhood of London, with the number of acres (in some instances) under the particular kind of vegetable that principally prevails, or for which the place is most remarkable.

Barnes, 150 acres in garden-grounds, and 100 acres under garden crops.

The parish of Bermondsey contains 110 acres of garden-ground.

In Camberwell, there are above 300 acres in the occupation of the farming gardeners and cow-keepers, who are more numerous here than in any other parish in Surrey.

In Lambeth, the market gardeners occupy about 250 acres.

In Mitcham, the physic gardens, as has already been noticed, occupy 250 acres.

In Mortlake, 70 acres are cultivated with asparagus; and 10 acres in this parish and Barnes, are employed in raising onions for seed.

In Putney, 120 acres are occupied by market gardeners.

In Rotherhithe, there are about 40 acres under garden crops.

In Wandsworth, about 220 acres are occupied by the market gardeners.

It is reckoned, that the whole quantity of garden-ground in Surrey, employed in raising vegetables for the London market, amounts to about 3500 acres; or nearly as much, according to Mr. Middleton's calculation, as in the three counties of Middlesex, Kent, and Essex.

The same author reckons the annual average produce of 500 acres on the Surrey side of the Thames, at 150*l*. per acre; of which he reckons 40*l*. for labour; 25*l*. for teams and dung; 5*l*. for marketing and expenses; and 10*l*. for rent, taxes, and tithes—in all 80*l*.; leaving for interest of capital and profit, 70*l*. per acre.

It is obvious, however, that on this, as well as many other subjects, conjecture, rather than actual knowledge, is the foundation on which the calculations rest.

* * *

## SECT. II.—ORCHARDS.

Most of the farms in the county have orchards attached to them, sufficiently large to supply, in a favourable year, from four to twelve hogsheads of cider; but as they do not form the principal part of the farm, and the main dependence of the farmer, they are not much taken care of.

One of the largest I observed was in the parish of Newdigate, in the Weald; it belongs to the Duke of Norfolk, who had lately purchased the estate on which it is. The situation of it may give a pretty accurate idea of the general state of orchards in this county: the trees were almost hidden under moss and liverwort; and of course, they were very languid and unhealthy. They were planted at a considerable distance from each other, about 40 feet; and, with what object I know not, the soil round the roots of each tree was raised to the height of two or three feet, so as to form a mound of nearly three yards in circumference. It may be, that this mode of planting them was intended to keep them dry, and to afford the roots of the trees a sufficient quantity of good soil in which to spread themselves. The former object might certainly have been attained, with equal benefit to the trees themselves, and with much greater advantage to the field at large, of which they occupied so very small a portion, by draining the whole enclosure: this, however, was neglected; and the pasture, which, from the appearance of the trees, promised to be much more valuable than them, suffered from the want of drainage. Cattle were taken into this field, as well as the other parts of the Duke of Norfolk's estate in the parish of Newdigate; though probably the apple-trees were not so very tempting as to be damaged by them.

It is a very general complaint in Surrey, that the oldest and best kinds of apple-trees have fallen off very much within these few years; so much so, indeed, that a very moderate crop of apples is seldom got from them, even in very favourable years. It is well known, that similar complaints are made in most parts of the kingdom. In Surrey, the cause of this failure does not seem to have led to much conjecture: every body is surprised at it, and considers it as very strange and unaccountable. The only surmise, with respect to the cause of it, was, that the cold, raw, north and north-east winds, in the spring of the year, blighted the apples so much, that they never recovered it afterwards, however warm and favourable the summer and autumn might turn out. A fact was mentioned as corroborating this opinion, viz. that some apple-trees, completely sheltered from these winds, did not experience that blight, and consequent failure of crop, to which all such trees as were exposed were constantly liable. But the fact, in my opinion, hardly bears out the supposition. In the first place, if exposure to the north and north-east winds were the sole or principal cause of the failure of the crop, then the same difference with respect to the produce of trees sheltered and trees not sheltered, must have existed formerly to as great a degree, and as strikingly, as it does at present; unless indeed we suppose (what is a common opinion), that the north and north-east winds prevail much more regularly and constantly, and are more piercing and prejudicial now, than they were 40 or 50 years ago. It is, however, much more reasonable to suppose, that the principal cause lies in the trees, and not in the change of climate; and that the old and best sorts of apples are wearing out, because the trees which produce them are partaking of the infirmities and age of the original stock. At the same time it is obvious, that such trees will decay fastest, which are exposed to the most unhealthy and cold climate. From these two causes operating together, we may expect, that all the old varieties will discover signs of decay, by being more precarious in their crops; but that such trees as are more particularly exposed to cold and raw winds in the spring, will suffer the most.

It is also obvious, that the natural decline of the apple-tree will be hastened or retarded, according as the pruning is conducted with care and judgment, or with inattention and want of skill; and according as the branches are kept more or less free from moss and liverwort. The proper, regular, and complete pruning of the apple-tree, becomes a matter of even more importance and consequence than it is usually deemed, when we consider that those trees, which are generally considered and treated as young, are in fact very old, and consequently subject to the weakness and decay of old age. Even admitting that Mr. Knight's opinions are not received as indisputably established, still, as they must be allowed to be highly plausible, and to be well and strongly supported, it assuredly is the wisest and safest method to act as if they were certainly true, especially as the extreme care and attention with which we would treat aged and decaying trees, must be highly beneficial even to those that are young and healthy.

It may be alledged, that the quantity of moss, &c. seen on many trees, is the consequence and the symptom, not the cause of their decay. There can be no doubt that in vegetable, as well as in animal life, it is often difficult to distinguish the consequence of disease from the cause of it; but it is no less true that, both in vegetable and in animal life, disease which proceeds from debility will, if suffered to remain, most certainly increase that debility, and accelerate death. Even admitting that the moss, &c. on the branches of the apple-tree, are solely the consequence of the weakness and decay of the tree, and that they would appear again, let them be cleared off ever so frequently, still there can be little doubt, that the life and fertility of the tree will last longer, the more constantly and completely free its branches are kept of the moss.

On a subject of such importance as the preservation, even for a few years, of those trees from which our choicest and most valuable fruit is procured, no hints, if they promise the least success, or will stimulate to further investigation, can be deemed useless, or will, I trust, be considered as irrelevant, even though the particular county under review is not peculiarly, or in any great degree, interested on the subject.

# CHAP. X.

## WOODS AND PLANTATIONS.

THE district of Surrey, most remarkable for its timber and underwood, is that which lies between the chalk-hills, or (more correctly speaking) between the narrow stripe of sand to the south of the chalk-hills, and the county of Sussex. This district, both from its present appearance, from what we know it formerly was, and from its complete resemblance in soil, surface, and productions, to the adjoining part of Sussex, seems equally entitled to the name of *Weald.*

There are many reasons for the belief, that the *Weald of Surrey* was formerly an entire wood, and that it was cleared and cultivated at a much later period than the other parts of the county. It is natural to suppose, that the first cultivators would be directed in their choice to such spots as presented fewest obstacles, and as promised the most abundant reward for their labour. Hence, a country like the Weald, which from the lowness of its situation and the dampness of its clay soil, presented a thick covering of stubborn oaks, and promised but scanty crops even if it were cleared, to the indolence and unskilfulness of its rude inhabitants, would be passed over in despair or neglect, while any neighbouring tract less encumbered and more fertile, remained for their occupation and culture.

Even after the Weald was begun to be cultivated, the progress appears to have been very slow: we have the evidence of history and tradition, that it was long very thinly inhabited (as it is yet indeed, in comparison with the other parts of Surrey); and that in many parts of it within these hundred years, much less corn was grown than was necessary for the consumption of its inhabitants. The distance of the Weald from any considerable market, the badness of the roads, and the want of coal, all seem to have contributed to the preservation of the wood, and of course to have prevented the clearing and cultivation of this district. The very trifling value, however, of wood, in a country thinly inhabited, cut off from other districts, and abounding in timber, necessarily led to the formation of better roads: and these again changed the face of the country, both by opening a market for the timber and for corn, which as yielding a quicker return, was preferred to timber, now that the superfluity could be disposed of.

The great increased value of wood, when a market was opened for its sale, and the temptation to convert the ground, after the wood was felled, to the purposes of arable husbandry, appear to have thinned many parts of the Weald of its timber, which would certainly have been much more profitable in wood than in any other mode of occupation. This is beginning to be seen and acknowledged by many of the proprietors in the Weald, though in other parts I was informed, that it was still the practice to clear the wood from lands very ill suited either to grass or tillage.

From the Weald being what may properly be styled, *naturally* a wood country, and from the attention and skill of its inhabitants having been so long turned to its management, we may justly look up to their mode

as

Digitized by Google

as in most instances, at least, the best calculated for their particular kind of woods in their particular soil and situation.

The great objects in the Weald are the timber and the underwood. From the many purposes to which the latter is applied, and the consequent high price which it bears, the proprietors in the Weald are not so anxious to have their timber open and unencumbered as they are in many other wood districts. Hence their timber, enclosed on all sides by the underwood, grows up tall and straight, unfit for any purpose in which *knees* or crooked timber is wanted.

Having offered these general preliminary remarks, we shall now proceed to a detail of the management of the coppice and timber in the Weald of Surrey; and afterwards give an account of the woodlands in the other parts of the county, so far as they offer any thing different in their produce or management.

*Copse-Woods.*—These consist principally of the oak, birch, ash, chesnut, sallow, hazel, and alder. As it is the usual practice of the woodmen of the Weald of Surrey, to look entirely to seedlings for a supply of timber, the sapling shoots from the stools are the principal source of copse-wood. After a fall of timber, these saplings are preserved and taken care of, and thus the undergrowth is continually increasing, and the demand for copse-wood regularly supplied. It is plain, that if the stools of the fallen timber had but common justice done to them in protecting them from cattle, and draining the adjoining ground, a most ample supply would be obtained from every part of the Weald. But though this judicious mode is followed in many parts, yet a very slight inspection of the underwoods will convince any one, that it is not nearly so general as it ought to be. Proper care and attention, especially to keeping the soil dry, will go a great way to ensure a full and regular supply of copsewood; but as even under the most judicious and attentive management, a partial failure will sometimes happen, it is proper to mention a method which has been found by many proprietors of woods in Surrey, effectually to answer the purpose of supplying such failures.

It is simply by plashing the shoots where a vacancy appears. This is done by cutting the shoot about half through with a bill: the shoot thus cut is laid along the ground; at each of the joints a cut in the direction of the bough is made, over which a little fine mould and turf are laid; the shoot is kept close to the ground by means of pegs. At each point, the shoot that is plashed will take root, and throw out several saplings. As soon as the shoot that has been plashed appears to have taken sufficient root in each of its points (which generally happens in two or three years), it is entirely separated from the parent stool: after this is done, the shoot itself is divided in every point where it has taken root, and thus several stout and flourishing saplings are procured from one shoot, which are found to thrive better than the shoots managed in the usual manner, and to be less hazardous than fresh planted trees.

It is not, however, only in the direct advantage of this mode that its superiority consists: it is plain, that whoever adopts it must pay more than the usual attention to keep the ground clean and dry, otherwise the shoots thus managed would be overpowered and destroyed before they had taken sufficient root. As holding

Digitized by Google

ing out the necessity of working the ground, therefore, this mode should be recommended and adopted, even though the direct advantages derived from it were less certain and important than they actually are.

The sallow, ash, alder, and willow, are found to answer best in this mode of management; they succeed best and take root in the shortest space of time: oak, chesnut, maple, and some other trees, are more hazardous and pay worse, both because they oftener fail, and because they require longer time before they can be detached from the parent stool, and of course, before they are fit for the market.

*Age of Cutting.*—The value of underwood has risen so much lately, that this circumstance alone, even if no other operated to the same end, would naturally cause the underwood to be cut down before its proper season. To this may be added, that where a farm is held under a lease of twenty-one years, possessed of any great extent of coppice, the farmer is tempted to get two cuttings during the currency of his lease, even though neither of them afford much profit, and though by this method he is not doing justice to his landlord or his successor.

Perhaps the greater part of the copse-wood in the Weald of Surrey, is cut between nine and ten years: this however is allowed to be much too early. Taking the different kinds of soil, or rather the only varieties that exist in this part of Surrey, the paler and moister, and the darker and drier clays; and the different kinds of wood which usually form the coppice, fourteen years are considered necessary to bring them to a proper size: and this period is allowed for the growth, where no temptation leads to a premature cutting.

*Rent.*—This is generally regulated by the rent of corn-land in the neighbourhood: or more properly speaking, copse-wood, though the returns from it are but seldom, yet as it requires, or at least receives, little or no labour, and is exposed to few accidents, is taken at the same rent as the other parts of the farm, where it forms part of a farm, or where it is taken by itself at the average rent of the district. As the Weald is more favourable to the growth of wood, and at the same time less favourable to corn than the other parts of Surrey, it might be expected that *there* copse-wood would let at a higher price than corn land. This, however, is certainly not the case generally: in some instances it may, but in these the cause is to be sought in the superior state in which the coppice is, rather than in the relative value between it and corn land. The most common rent of copse-woods in the Weald, is from 12*s.* to 16*s.* per acre: in the other parts of Surrey, which are not affected by their very immediate vicinity to London, the rent may run from 15*s.* to 20*s.* per acre.

The neighbourhood of a copse to London, especially where the wood in it is such as there is a great and regular demand for there, appears to have more effect upon the rent of it, than would be produced upon a corn farm at the same distance.

*Produce.*—In the neighbourhood of such a city as London, and in a county where there is so great a demand for fuel, both for domestic purposes and for the forge, the brick-kiln and the lime-kiln, not the smallest nor the most trifling part of the underwood is useless, or without its value. The following are the principal purposes to which copse-wood is applied, arranged according to the comparative profit they bring.

Hoops.

Digitized by Google

Hoops.
Gunpowder charcoal.
Charcoal for other purposes.
Poles of the largest size, for hop-plantations.
Hurdles.
Faggots.
Kiln-faggots.

*Hoops.*—The sallow or withey, the birch, hazel, and ash, are principally used for hoops. They are cut of nine different lengths—from two feet to thirteen feet: the larger kinds are generally sent to the West Indies for sugar-casks; the smallest are used for butter-firkins. Some trees will cut into ten hoops; from others, only two can be got. They are tied up in bundles, 60 hoops to the bundle; 30 bundles make a load.

They are split, shaved up rough, and tied in the woods, as well as cut and branched: there are different sets of workmen for these operations. In the year 1807, 7*s.* a load, or 3*d.* a bundle, big and little, was paid for cutting and branching the trees intended for hoops. The workman guesses the number of hoops which each tree will split into, and reckons accordingly in making up his bundles: from 8*d.* to 1*s.* is paid for splitting, rough-shaving, and tying up the bundles.

The price varies with the size, and the uses to which the hoops can be applied: in 1807, the price per load was from 5*l.* to 7*l.* on the ground. The number of loads off an acre is also very various: eight loads of different sized hoops have been cut off an acre, even where the growth was not longer than ten years; but this instance was mentioned as very extraordinary: four load is much more common.

*Gunpowder Charcoal.*—There seems some difference of opinion respecting the kinds of wood most proper for making this article: by some, the harder woods, especially the oak, and the larger parts of them, are deemed the fittest; while by others, the smaller woods, the alder, dog-wood, and sallow, are esteemed the best.

The burning of charcoal appears to have been long carried on, before a method of preventing the waste of it during the process, by the admission of the air, was invented. It had indeed been noticed by the workmen, that the quantity of coal which they procured from a given number of cords of wood, varied according to the extent of surface exposed to the air; and their experience had suggested an imperfect method of preventing the access of more air, than they conceived necessary to support the combustion.

Till within these 18 or 20 years, the only method of making gunpowder charcoal in use was the following, which is still employed where the coal is meant for common purposes.

A situation, exposed as little as possible to the wind, or to any partial current of air, is chosen: if the situation is unavoidably high and exposed, screens are used, to shelter the pile while burning.

The faggots or cords of wood intended to be burnt into charcoal, are placed regularly round a quantity of straw, till they form a circle of ten or twelve feet diameter; upon the top of this heap, more straw is placed, and round it, another circle of faggots or cords. On the top of the whole, turf, dung, or moist earth, is carefully and regularly clapped down, in order to keep up a smothering combustion. The straw at the bottom of the heap is then set fire to; and great care is taken to keep up a slow, and, as it were, a subdued fire. If the fire becomes rapid or violent, the wood in

Digitized by Google

the pile sinks, and the quantity of charcoal procured is much less than it ought to have been, and would have been, if the fire had been properly managed.

It is plain, that this mode is subject to many unavoidable inconveniences, besides those which arise from the inattention or unskilfulness of the workmen. It depends upon the situation, which cannot always be found; upon the wind, which, by its rising, may diminish considerably the quantity of charcoal: and even when both the situation and the state of the weather are favourable, no care can at the same time admit air sufficient to carry on the combustion, and not so much as will diminish the product.

To prevent this loss, a very simple and ingenious apparatus is used in different parts of the Weald, and at several of the gunpowder-mills where they burn their own charcoal, particularly at Malden, which completely answers the purpose intended by its adoption. The only part of the wood that forms what is called charcoal, is what may properly be termed the vegetable fibre: the other component parts, the water and oil, are driven off by the heat. The great object, therefore, is to drive off these only, and to leave the charcoal entire: to effect this, the air must be excluded; since, if admitted, it will immediately unite with, and carry off the charcoal, in the shape of gas. The apparatus that is used, completely answers both these purposes: it is merely a cylinder of iron, with an orifice or tube in one end of it: it is filled with wood intended to be charred, and a strong heat is then applied to it; this separates the water and oil of the wood, which are drawn off by the tube; while the charcoal, being completely shut out from the air, remains undiminished.

When the wood is burnt in a pile, eleven cords, each cord sixteen feet and a half long, four feet high, and three feet broad, form one pile: the price is about 16*s.* a cord*: if the weather is favourable, 48 hours are required to burn a pile. A cord of good wood, if properly burnt, will yield about six sacks of charcoal, each sack containing five bushels. The expense of burning a pile of eleven cords, is about eleven guineas, including the price of the wood, the preparing, piling, burning, and carrying it, and the wear and tear, &c. The price at London is about 5*s.* a sack, which, at six sacks to every cord of wood, is about 16*l.* 10*s.* the pile, leaving a profit of 4*l.* 19*s.*: from this, however, is to be deducted the expense of the carriage to London.

*Common Charcoal.*—The woods employed to make common charcoal, are less nicely sorted, and in general smaller, than those used for gunpowder charcoal: the price, of course, is lower, about one-third; and the mode of charring wood for common purposes, is invariably, I believe, by the pile.

*Poles for Hop-Plantations.*—Where these are of the largest size, they are extremely valuable:—even such as are fit only for the shorter vines, bring a good price; those of 12 feet high selling in the wood for 12*s.* or 15*s.* per 100; those of 15 or 16 feet high, for a guinea or 22*s.* per 100: poles of the largest size, 20 feet high, usually bring a higher price in proportion. The kinds of wood used for hop-poles, have already been mentioned under the article *Hops.*

*Hurdles.*—These are generally made of hazel, oak, ash, sallow, or maple. In gentlemen's grounds, where it is desirable to have the hurdles corresponding as much as possible with the neatness of every thing around them, the Lombardy poplar is often employed for hurdles. Common hurdles sell for about 12*s*. or 14*s*. per dozen, made of hazel wattled—the length from seven to nine feet.

---

* The best kinds of wood for gunpowder charcoal are considerably higher, running from 24*s.* to 27*s.* per cord.

*Faggots.*—The harder and heavier woods are found to make better faggots than the woods that are lighter and softer: the oak, chesnut, ash, &c. give out more heat than the hazel, sallow, alder, &c. It has also been observed, that wood which grows slowly, on a soil apparently less kind and favourable, will burn better than wood which grows fast, on soils generally considered more proper for timber*.

The price of faggots varies according to the situation, in some respects, but in a greater degree, according to the purposes to which they are to be applied. In the more remote parts of the Weald, kiln-faggots, made of the spray, sell in the wood for 8*s*. or 10*s*. the 100; faggots for fuel, for 20*s*. or 25*s*. per 100: in other parts of the Weald, and in the northern parts of the county, the former kind are about 15*s*., the latter 35*s*. and sometimes as high as 40*s*. per 100; but at these latter prices, they are brought to the purchaser.

In the making up of the bundles, there is great room and temptation to deceive the purchaser, even if the workman knows that there are certain distinct rules

---

* The durability of oak for hop-poles, seems to be exactly the reverse. "It was remarked to me," says Mr. Marshall, "by an enlightened and intelligent hop-planter, that oak-poles grown upon the chalk-hills (on a strong clayey soil in a bleak exposure), are not so durable as those grown in the Weald, though the latter are of quicker growth."—(*Marshall's Southern Counties*, i. 216.)

Digitized by Google

laid down for the size and the making of the bundles: it is too common a practice, to stuff into the heart of the faggot, the small branches which he cuts off the sides of it. The assize for the making them certainly makes this illegal; it declares, that "faggots for fuel ought to be 24 inches of assize, besides the knot of the bond; and every faggot-stick within the bond shall contain full three feet of assize, except only one stick, which is to be but one foot long, to stop or harden the binding."

The workmen are paid from 2*s*. 6*d*. to 3*s*. per 100, for cutting and tying them.

From the different purposes to which copse-wood is applied, and the different prices which it brings accordingly, it is sufficiently evident, that the value of an acre of it must vary greatly: this variation is still further increased, by the different ages at which the copse-woods are cut, and by their situation in respect to convenient and good roads, and a market. If the copse-wood is allowed to stand only 10 or 11 years, its value seldom reaches 16*l*. per acre, unless in particularly favourable circumstances: if it be 14 years old, and contain a good proportion of wood fit for hoops, twenty-feet hop-poles, and gunpowder charcoal, the value of an acre will run from 18*l*. to 24*l*.

---

The woodlands in the other parts of Surrey contain, in general, a greater proportion of coppice, and fewer timber trees, than those we have been considering in the Weald: this is more particularly the case on the chalk-hills of the county. The kinds of wood in the coppices are much the same as in the Weald: the uses to which they are applied are also similar, except that charcoal is much more frequently made from the underwoods of the Weald, than from those of the other parts of the county. Stakes, edders, hurdles, hoops, and faggots, are the principal products of the copsewoods now under consideration. As we approach the metropolis, the underwoods are cut at much shorter periods than at a greater distance: from seven to ten years is the usual age of felling, at the distance of 15 or 20 miles from London.

Besides the coppice that grows along with the timber, there are in most parts of the chalk-hills what are denominated "shaws:" these are small spots of copsewood, unmixed with timber. They are found to be very advantageous while growing, as shelter for the sheep; and are used, when cut down, for hurdles, &c.

*Woods.*—The kinds of timber that are found in Surrey in the greatest abundance, are the oak, beech, walnut, ash, elm, box, yew, birch, fir, larch, and maple: besides these, the lime and chesnut are found about gentlemen's seats. Before proceeding to detail the value, application, &c. of these different kinds of trees, it may be proper to give a summary account of the general principles on which the timber in the woodlands of Surrey is managed.

It has already been noticed, that the principal dependence for a regular supply of timber is on the seedling plants, that naturally rise, or that are put in, wherever the vacancy is not filled up by the vegetation of the scattered seeds. The shoots are never looked up to for this purpose, being regarded as paying better when cut for underwood. The thinning of the seedling plants generally takes place when the underwood is cut; and at the same time, such as have sprung up since the last fall, are carefully preserved, wherever the first seedlings are considered as too thin. Thus, in the course of time, the ground is entirely occupied by young timber trees, growing up among the sapling shoots of the former wood.

In consequence of the great value of the underwood, it is preserved and cut so long and often, that the young trees, from want of room and air, necessarily grow up tall and straight, and with few side shoots near the bottom. In the woods, the common length of stem is from 12 to 15 feet: in the hedge-row timber, where there is more air, and where the underwood is less close and strong, the side shoots come out at the height of eight or ten feet.

The seedling plants are carefully set out at such a distance, as prevents them from crowding and injuring one another. This is done either entirely at first, or they are thinned more and more in proportion to their growth, and the prospect the different plants give of being luxuriant and strong. Tall straight timber will evidently be procured, by not setting them out to their full distance till they attain a considerable size; while it is equally plain, that crooked timber will be got, if, in the first instance, and when they are very young, the seedling plants are set out at their full distance.

The confined state in which the timber grows till it overtops the underwood, renders it very seldom necessary to use the pruning-knife: and partly from its seldom being necessary, and partly from a prejudice entertained against the practice, the pruning of timber trees is dispensed with, even where there would be an evident utility in adopting it.

The most commendable part of the management of the woodmen in the Weald of Surrey, is that which respects the draining their woods: the soil is so retentive,

tive, and the surface so inadequate to carry the water off, that this practice seems to have forced itself in a manner, upon their notice and adoption, as the only method of preserving their woods from destruction: and from the great and evident good effects produced by keeping the surface dry, under-draining has been employed, with results equally beneficial, in many parts of the Weald.

The trees are always taken down by the saw: this is preferred to the axe, as leaving the stools in a more proper condition to throw out sapling shoots. The inclination is given either by the axe on the falling side, or by a wedge put into the opposite side.

*Oak.*—The most approved method of raising oaks, is to sow the acorns in the autumn, in preference to the spring, which is frequently the time chosen for this purpose. By autumn sowing, the young plants gain nearly a year in advance of those which are not sown till the spring.

By some of the most experienced and successful woodmen of the Weald, the following method is pursued. The field in which it is intended to sow the acorns, is completely summer-fallowed; and during this operation it is thoroughly cleaned of all root-weeds, and has a good dressing of manure and sometimes of lime given it. At the last ploughing it is ridged up so as to keep it as dry as possible during the winter. Wheat is then sown in it at the usual season; and after the wheat is well harrowed in, acorns are put in with a dibble, at about one foot distant from each other. When the wheat is reaped the ensuing autumn, the seedling oaks are not sufficiently high to be cut or injured by the sickle; the stubble serves as a kind of protection

Digitized by Google

tection to them during the winter: and in two or three years after the acorns were put in, the seedling plants are fit to be transplanted.

It is doubted by many, whether it is better to suffer the oaks to remain where the acorns were planted, or to transplant them. As facts which bear directly upon any disputed point in rural economy, are much more important, and tend much more to a satisfactory and clear decision, than conjectural or speculative reasoning, there needs no apology for giving the following quotation from Mr. Malcolm's agriculture of Surrey.

" In the parish of Charlwood, in this county, and on a farm occupied by Mr. Prior, a very respectable farmer, and tenant to Sir Thomas Wallace Dunlop, Bart., I was sent down to value the timber previous to its being sold, about three years since. In looking over them, I could not help remarking the difference in the manner of the growth, the cleanness of the stems, and the magnificence which many of the heads of some trees had over the others.

" Upon observing this to Mr. Prior when we had finished our measurement, he assured me that all those had been planted by his uncle (not sown) when he was a boy; that his uncle took great delight in planting, and was very proud of these trees; that they grew very fast while they were young, and soon out-topt those which were much older, and had sprung up spontaneously; that they shared one common fate, nothing having been done to either of them but keeping out the cattle; that some of the largest trees that were nearest the house, he used to amuse himself by bending to the ground, and though then a boy, he perfectly recollects that they were more pliable, or as it were, more elastic than the others: and it was a remarkable fact, that soon afterwards, the spontaneous trees were attacked in their upper branches with moss, their growth appeared checked, and they never afterwards recovered themselves effectually: while the transplanted trees had scarcely any moss, were clear stemmed and growing vigorously, and in general were worth from 10*s*. to 15*s*. each tree more than the others. As all the trees grew promiscuously over the farm, many of them adjoining to each other in the same hedge, there could be no difference in the soil, and therefore I leave it to the opposers of planting oak, to account for this unquestionable superiority."—(Vol. iii. p. 153).

In the Weald of Surrey it is a general remark, that the oaks on the dry spots grow much more slowly than those which stand on a moist, but not a wet soil. The latter, however, decay sooner than the former. On a moist soil, the leaves of the oak are of a darker green colour, and a larger size, and the bark is more roughly and deeply furrowed, than they are found to be in oaks growing on the drier spots.

The oak that is grown in Surrey, particularly in the hundreds of Tanridge and Riegate, has the character among sawyers, of being much more difficult to work than the oak of the adjoining counties: this, they say, arises from the grain of the wood running not nearly parallel with the bark, but transversely, so that when it is sawn into plank, the workmen cut against the grain.

Either from the great demand for oak timber, or from some other causes, the age of felling in the Weald is much earlier than it ought to be, if the most profitable and important uses of the tree alone were regarded.

Few oaks are suffered to reach sixty years before they are felled: at this age they will seldom yield more than a ton of timber each.

The value of all kinds of timber on the ground, particularly oak, has been increasing within these last twenty years, more rapidly and in a greater proportion than most other agricultural products. This seems to have arisen from an increase of demand both for the wood and bark, unaccompanied with the prospect of an adequate supply after the trees now on the ground are felled. Besides this circumstance, which is common to the Weald and other oak districts, the timber of this part of Surrey, and the adjoining part of Sussex, has always been in higher estimation than that of other woods. At present, the price of oak standing will run according to its quality and measurement, from 10*l.* to 13*l.* per load*.

In drying and "hatching" the bark, the greatest care and attention are taken. The smaller pieces of bark are set up against poles laid along the top of forked piles, or a cord run along the top of a line of stakes: these are defended from the rain partly by being set up nearly perpendicular, and partly by the larger pieces of bark which are laid across the top of them. After the bark is dried it is taken down from the "tristle," and "hatched" in some place under cover; *i. e.* the rough rind, moss, and every thing else that would injure the quality of it, are carefully shaved off: lastly, it is cut into small pieces and packed in bags. Bark is sold either in the rough, or dried, "hatched," and cut: in the first case it brings from

---

* In 1798, large oak timber in the Weald was 5*l.* per load; in 1803, it had increased in price to 9*l.*

20*d.* to 2*s.* per yard; in the latter, about 30*l.* per load of 45 cwt. The price of it, however, varies extremely.

Though the Weald of Surrey contains the finest and largest oaks, yet this tree is to be found in almost every other part of the county, with the exception of the sandy and heathy districts on the west and south-west. On the northern clays, there are some large and healthy trees, but on the chalk-hills, particularly in the higher and more exposed parts, the oak does not seem to answer, as it generally becomes stunted and mossy.

*Beech.*—This tree, unlike the oak, thrives best on the chalk-hills: indeed, it may be regarded as naturally one of the kinds best adapted to this soil, especially where the ground is high and exposed. The beech is to be met with in almost every part of the chalk-ridge of Surrey, both on the northern, more sloping side, where the soil is better and the situation less exposed; and on the southern precipitous side, where the soil is thinner and the exposure much greater. They seem, however, to thrive best where sainfoin grows well, viz. on a hazel loam of a tolerable depth, with a loose chalky subsoil.

It is also found on the sandy districts of Surrey in a healthy and flourishing condition; but where it is met with on the clay soil, especially on the pale wet clay of the Weald, it does not appear to thrive well.

Perhaps the greater part of the beech which has not reached a large size, is employed in this county for charcoal. The larger trees are employed for several purposes in ship-building, where oak formerly used to be considered indispensably necessary. It is also bought up by the wheelwrights. The property which the timber of this tree possesses above most other timber, of remaining

ing for a long time quite sound in wet ground, seems to point it out as proper to be cultivated to a much greater extent than it is at present, on the chalk-hills of the county.

*Walnut.*—This tree also answers best on a chalky subsoil, though it requires a greater depth of upper soil than the beech. It is found in many parts of Surrey of a large size, and very productive, though no where in any great numbers. When the great value of the timber of this tree, and the high price which its fruit bears, are considered, it is rather surprising that it is not cultivated more extensively on the chalk districts of Surrey.

A good sized tree, upon a kind soil, will, in a favourable year, such as the present (1807), produce 20 bushels of walnuts; or, reckoning the bushel to contain 700 walnuts, 14,000 walnuts. I was informed of two trees near Buckland, from which nearly 50 bushels had been got. Those who retail them, pay this year from 8*s.* to 10*s.* per bushel: the price wholesale is about 5*s.* or 6*s.*; so that the fruit alone of each tree may fairly be reckoned worth 4*l.* or 5*l.* The fair at Croydon, about the end of September, is the great mart for the sale of this fruit: it has been calculated that four millions of walnuts, or 2000*l.* worth, at 1*s.* per 100, are often sold there*.

The timber of this tree also bears a high price, and is in considerable demand for gun-stocks, drawers, chairs, &c. The price of it runs from 7*l.* to 10*l.* per load, at the distance of 15 or 20 miles from London.

---

* Perhaps the greatest number of valuable walnut-trees in Surrey, are in Norbury-park, near Box-hill. It may be mentioned as a proof of the great uncertainty of a crop of walnuts, that in some years, 600*l.* worth have been gathered from the trees in this park; and in other years, scarcely a single bushel has been got.

*Ash.*—This tree, which is perhaps the worst to plant in hedge-rows, on account of the wet that drips from it being hurtful to many vegetables, and from its horizontal roots being in the way of the plough, is nevertheless in this county seldom seen any where else. It is not even cultivated in the neighbourhood of Farnham in any quantity expressly for the use of the hop-plantations, though for this purpose it is very valuable.

The ash is found to thrive nearly equally well in all the various soils of Surrey, and in almost every situation; the best, however, are to be found in the low and sheltered parts of the county near the Thames, on the moist, but not wet, clayey loams: here, partly from the goodness of the timber, and partly from the convenience of water-carriage, an acre will frequently fetch 22*l.* at ten years' growth. This tree is not more remarkable for the variety of soils on which it thrives, than for the different purposes to which it is applied. Perhaps it is the most useful tree next to the oak. Besides the purposes to which it is applied wherever it is grown, it is bought in this county by the nurseryman: to him the poles of ash are sold at about 2*s.* 6*d.* a bundle; the number in each bundle varying, according to the length of the poles, from a dozen to three dozen.

*Elm.*—Some very large and fine trees of this species are to be seen in almost all the hedge-rows to the north of the chalk-hills, particularly about Cheam, Croydon, Carshalton, &c.: in the more immediate neighbourhood of London, in the parishes of Lambeth, Streatham, and Mitcham. It is also met with on the sandy loams directly below the chalk-hills, about Shire and Abinger.

The same fault respecting the management of this tree is chargeable on this, as on most other counties: it will bear pruning better, perhaps, than most other trees; and this is frequently repeated so often, or carried to such excess, as not only to spoil its appearance, but also to retard its growth, and injure the quality of the timber.

In the more northern parts of the county, within seven or eight miles of water-carriage, the demand for elm, for ship-timber, has within these few years been very great. The smaller trees have also been much in request for pipes; and it is said that the county of Surrey has supplied, in a great degree, the waterworks of Liverpool with elm for this purpose.

Besides the common English elm, another variety, called the Scotch elm, is met with in some parts of Surrey; but it is not deemed so useful or valuable as the former: its timber, indeed, is closer grained, and harder; but from its being more crooked and knotty, its uses are more confined, and the trouble and waste in working it, greater.

About 15 years since, elm used to be sold, standing, for 8*d*. or 9*d*. a foot: now the price, in consequence of the increased demand, without a proportionate supply, is more than double.

*Box.*—This is known only as a dwarf, or garden shrub, in most parts of England: in Surrey, and the adjoining county of Kent, however, it flourishes as a tree of considerable size. The hill in Surrey on which it is found, was originally called the White-hill; but from the great number of box-trees with which it has long been covered, it is now much better known by the name of Box-hill.

The common report, probably handed down by tradition, is, that the Earl of Arundel, in the reign of Charles I. brought the box-tree from Kent, and planted it on the White-hill *.

The soil of Box-hill is a thin pale-coloured loam, lying very near the chalk: the elevation of the hill is considerable, and the greatest quantity of box is found on the south or precipitous side.

The period of time required by the box-tree to arrive at a proper size and quality of timber for cutting, is not exactly known; but it is supposed, that more than half a century is necessary for this purpose. The succession of the crop is kept up, partly by the seeds which are annually scattered, and partly by the shoots from the stools, after the timber is cut.

The price of this wood was formerly much higher than it is now: this is owing, in some measure, to the diminished demand, and the importation from Holland and other parts of the Continent; but principally, to the greater quantity which has latterly been cut on Box-hill. The former proprietor of the estate sold the box for 15,000*l.*: the purchaser was to be allowed 14 years to cut it down: hence the supply has been much greater than formerly; and as, while it was scarce and dear, substitutes had been found for it in many manufactures, the price has necessarily declined very considerably. In the year 1802, 40 tons were cut on Box-hill; and when the limited use to which this wood can be applied, is considered, it is by no means surprising that the price should have fallen more than 50 per cent. It will not now bring more than 5*l.* or 6*l.* per ton.

---

* Mr. Manning, author of the History of Surrey, is of opinion, that the box on Box-hill is coeval with the soil: it can actually be traced back to the beginning of the seventeenth century; in a lease dated 1602, the tenant covenants to use his best endeavours to preserve the yew, box, &c. In an account taken in 1712, it is supposed as much had been cut a few years before, as amounted to 3000*l.*

Most of the box is bought by the mathematical instrument-makers, for scales; and by the turners in London and Tunbridge.

*Yew.*—The appearance of this tree, and the different situations in which it is found in the county of Surrey, give considerable weight to the opinion, that it is indigenous in this island. From the circumstance that it is generally found, in most other parts of the island, in places and situations where it had evidently been planted and taken care of, the opinion that it is not a native of Britain, seems first to have arisen. In Surrey, however, it is scattered over almost the whole extent of the chalk-hills, where it is evident that it was not planted by the hand of man, and that it did not spring from the seed of the cultivated trees. On the chalk-hills, it is indeed less luxuriant, and more stunted in its growth, than in the richer soils and more sheltered situations, in which the customs and the laws of our ancestors had planted it; but the general appearance of these trees (particularly of such as grow on the north of Box-hill), as well as the variety of soil and situation in which they are found, seem to point them out as natives.

However this may be, the county of Surrey is remarkable, both for the great number of yew trees which are scattered on its chalk-hills, and for the size to which some of those that have been cultivated, have reached. In the church-yard of Crowhurst, in the eastern part of the county, there is a yew tree which is 50 feet high, and 36 feet in circumference, at five feet from the ground. There is another very fine tree in the church-yard at Little Bookham, between Leatherhead and Effingham, which, though it is not nearly so large as the one at Crowhurst, is very striking, particularly from the wide and regular spreading of its branches.

The wood of the yew is wrought up for turnery ware; it is also used for axletrees, and for steps to ladders: its character is durability. The young shoots are cut for walking-sticks and whip-handles: the ready sale for these, and the ease with which they can be concealed, and conveyed to London, causes many depredations to be committed on this tree, as well as on the holly, which is also employed for these purposes. The price of yew on the ground is from three to five guineas, according to the length of stem, and the number and size of its branches.

*Birch.*—This tree grows well on the heathy parts of the county, to the west and south-west, besides forming a considerable portion of most of the underwoods. The *ware* of the birch is hop-poles, wood for charcoal, and brooms. The last are made in this county to a very large extent: the principal place of sale is Southwark. The price of birch faggots for brooms, is about 16*s*. per 100 in the wood.

*Fir. Larch.*—These trees are noticed here principally, because by means of them, the extensive heaths on the western side of the county have already been in part rendered much more valuable, and might, if they were enclosed, be rendered universally so. The following statement, founded on an actual survey and valuation, is given by Mr. Malcolm, of the value of the Scotch fir on the poor sands in the western part of the county.

"In the year 1776, Mr. Giles, of Farnham, planted for Sir Robert Rich, Bart. on Crooksbury-heath, 15 acres with Scotch fir: the soil so perfectly siliceous, as not to be worth half-a-crown per acre; at least, it never in any one year produced half that sum. The plants had been raised in a nursery belonging to Mr. Giles, and were four years old when they were planted out on the heath; but they had been previously removed, viz. at two years old, out of the seed-bed, and transplanted into beds or lines, at about one foot asunder between the rows, and eight or nine inches, plant from plant, in the rows. In this situation they remained the two years, gaining strength by the free admission of the air between them, and furnishing themselves with an ample supply of fibrous and lateral roots, which would not have been the case, had they remained in the seed-bed till they were planted out for good; because they are then found to have only one or two, or three at most, tap-roots, with scarcely any fibres at all; and these being cut off, either with the spade or knife, the plant never afterwards thrives well when thus exposed, deprived of its roots, and otherwise weak, and drawn up to the wind and weather, and in an inhospitable soil. But to return: at four years old, we find the plants removed to the heath, and planted irregularly from two feet and a half to three feet and a half distance asunder, or 4840 plants to an acre. The value of the plants was from 18*s*. to 22*s*.

per 1000; the digging the holes, and planting, cost about 40*s*. per acre. The acre would therefore cost the proprietor, for trees and planting, about 7*l*., which for 15 acres, would be 105*l*.; making good the plants that might fail through the plantation, 2*l*.: the total expenditure would then be 107*l*.

"In the season of 1783, which was about seven years after they were first planted out, a thinning took place, which however consisted only of stakes and spray: the latter were made into kiln-faggots, and sold at 10*s*. 6*d*. per 100; and the stakes at 1*s*. per dozen. In 1788, another thinning took place, and about 750 trees per acre were cut down, which sold at 8*l*. per acre, or 120*l*. total. In 1793, a third thinning was effected, and 750 trees were cut down, which sold at about 5*d*. per foot. At the fourth thinning, which was in 1798, the same number, or 750 trees, were taken out, which sold at 8*d*. per foot. At this time there were left in the plantation, in each acre, 1062 trees, of which 590 measured 869 cubic feet, and were valued at 1*s*. 6*d*. per foot; and 472 trees that would not measure one foot, but were valued at 16*l*. 16*s*. per acre. The total value per acre of the plantation will be therefore above 81*l*. 4*s*. as per specification, and the total number of trees are found to be as follows:

| *Now growing.* | | | £. | s. | d. |
|---|---|---|---|---|---|
| In 9 acres are - - | 4770 trees, | which measure 7820 feet, at 1*s*. 6*d*. - | 586 | 10 | 0 |
| In the same 9 acres are | 4254 | under one foot, valued at | 150 | 0 | 0 |
| In 6 acres are - - | 3400 | which measure 6600 feet, at 1*s*. 6*d*. - - | 495 | 0 | 0 |
| In the same 6 acres are | 4200 | small, supposed value, | 50 | 0 | 0 |
| | 16,624 trees. | | £.1281 | 10 | 0 |

"The trees that were taken out at each of these thinnings, were severally applied to the following uses: the lesser ones for hop-poles, which sold at 2*d*. and 3*d*. each; the others for rafters, ladders, and scaffold-poles, and these sold at 6*d*. each. Those which were used for hop-poles, were found to last from six to eight years."—(*Malcolm*, iii. 250.)

The fir and larch have been planted very extensively, and seem to thrive remarkably well, on the new enclosures at Weybridge, Frimley, &c. on land, perhaps as unprofitable and poor as any to be found in the kingdom.

*Maple.*—This tree appears to have been formerly much more abundant, and to have grown to a greater height, in many parts of the Weald, than at present. It is one of those which suffers most from the wanton extravagance of the tenant, who too often lops it in a most barbarous and injurious manner, so as both to check the growth, and destroy the beauty of the tree.

The uses to which the maple is applied in Surrey, differ according to the quality of the wood; and this again depends on the soil where it grows. On the moist clays of the Weald, where it grows fast, and puts forth strong shoots, the wood is straight, clear, and free from knots; it is then bought by the musical instrument-makers: on the harder and more gravelly soils, where its growth is much slower, it becomes knotty; and the wood of which these knots are composed, is used for veneering.

*Lime.*—" At Betchworth-castle, in this county, the seat of Henry Peters, Esq. there is a very fine avenue of limes, 150 yards in length, of considerable height and size, most of them containing not less than two loads of rough timber per tree."—(*Malcolm*, iii. 221.)

*Chesnut.*—This tree is cultivated more for its appearance and timber, than its fruit; since even in the most sheltered situations and the most kindly soils of Surrey, the produce is very uncertain. It appears to have been much more used in building formerly than it is now, and at that time to have been cultivated in greater abundance and with more care, in the neighbourhood of London. The belfrey of Sutton church, which, from some inscriptions in it, appears to be very ancient, is made of chesnut. In Felbridge-park, and on Copthorn-common, are many very fine chesnut trees.

*Ozier.*—In the western and north-western parts of Surrey, particularly about Byfleet, Chertsey, &c. the ozier and withey are much cultivated; and in many instances they are made to serve as a fence, planted on a mound of earth in moist situations, and as an article of trade. In other cases, they are planted on ground entirely for profit; and as they thrive well on soils ill calculated for either grain or other wood, they may there be regarded as a very advantageous crop.

The ozier is bought by the basket-maker at 3*l.* or 4*l.* per acre, and are cut every year*. A considerable number of women and children are employed at Guildford in manufacturing such as grow near that town for the London market. The ozier twigs are stripped of their bark by means of the willow break, and made up into large bundles: the expense of stripping and tying them up, is twopence halfpenny per bundle.

---

* From the following passage in Aubrey's History of Surrey, it appears that the cultivation of oziers is very old in this county; and that nearly 150 years ago, they brought about the same price they do now.

"In the *eights* of the river of Thames, and near it, and in other rivers which run into it, in this county and in Middlesex, are plantations of oziers, which yield 4*l.* or 5*l.* per acre to the basket-maker, and formerly was a good trade to Holland."—(iii. p. 167.)

*Furze.*—In a county like Surrey, in many parts of which kilns for burning lime are as common, and considered almost as indispensable a building on a farm as a barn or a stable, it is absolutely necessary to have fuel in abundance, and at command. Hence, furze, which in many parts is regarded as a useless or a noxious plant, is carefully attended to on such parts of the farm as are of inferior soil, or is sown on such parts, if it did not grow there naturally.

Another reason makes the Surrey farmer regard furze as a profitable crop: brick-kilns are very common in most parts of the county to the north of the chalk-hills; and hence, though there is less lime burnt in that part than in the Weald, yet the greater quantity of brick earth in the former, and the advantage of roads and a better market, makes the demand for furze, for the purpose of burning bricks, nearly as great in one part of the county, as the demand for it for burning lime is in the other.

In some of the new enclosures to the north of Guildford, it has been sown on a mound of turf as a fence, and seems to answer extremely well. In short, in a county, where from the profit attending it, the thought and attention of the farmer have been particularly called to its culture, it is probable, that if the demand for it continues to increase, the most advantageous plan of planting it, so as that it may benefit the farmer both while it stands, and after it is cut, in the highest degree, will soon be found out.

Although the furze will grow well on poor soils, yet these soils must be dry: if they are wet as well as poor, the furze will soon decay. Of course, the better the land is prepared by deep ploughing and draining, the better the crop will be; but it is often sown on foul and exhausted lands, and on ground that is wet and swampy.

It is generally sown broad-cast, at the rate of a gallon per acre: between Ripley and Guildford the drilling of it has been attempted, and if the rows are carefully kept clean by the hand-hoe, this mode will no doubt be preferable to the common one. The best time for sowing it is in spring, in order that it may take firm root before winter. It is much better to employ women or children to gather the seed than to buy it in the shops, as in the former case the quality of it can be accurately ascertained.

Furze is the better for being cut the first year, but a full crop will not be got till the second or third year. As when cut, it requires three years before it is ready again, it is the common practice to divide the field where it grows, in such a manner that there may be a full and regular crop every year from some part of it.

An acre of good furze will produce from 2500 to 3000 bundles; the common price is 6*s*. or 7*s*. the hundred, made up and delivered, so that the value of an acre may be reckoned at 7*l*. or 8*l*., or about 50*s*. annually. After the furze is cut, it is set up with the roots upwards, the bundles inclining to each other like corn, and the lower part or branches spread out, that the wind may penetrate and dry them.

As it may appear rather singular to pass over Richmond-park altogether without notice, though it is not an object of importance in an agricultural point of view, we shall give Mr. Lysons' brief notice of it: premising that the soil is a poor sandy loam.

"Richmond-park is nearly eight miles in circumference, and contains 2253 acres, of which scarcely 100 are in this (Richmond) parish: there are 650 in Mortlake, 265 in Petersham, 230 in Putney, and the remainder in Kingston."—(i. 456).

Surrey has been disafforested ever since the confirmation of the Great Charter of the Forests, 9th of Henry III.—*(Manning's Surrey).*

# CHAP. XI.

## HEATHS, COMMONS, AND COMMON FIELDS.

THE quantity of waste land in Surrey (without including the common fields, which, however, in many instances are little better), is immense, bearing a very great proportion to the whole surface of the county. Till the late enclosures took place, it was the general computation, that the sixth part of the land in this county was waste.

If we did not perceive with what slowness and difficulty practice follows the conviction, even of duty and interest conjoined, we should be surprised, that in a country which depends for its full supply of corn on foreign nations, there should be so much delay and unwillingness to diminish this dependence, and at the same time to increase the comforts and riches of the community, by enclosing and cultivating the waste lands. But this appears to be particularly incumbent and useful in such a county as Surrey; where, from the vicinity to the metropolis, the means of carrying on the improvement of the waste lands could be procured in such abundance and with so much ease, and the produce of the lands, when improved, could be disposed of in any quantity, and at a high price. In districts remote from manure and markets, there may be some excuse for not improving the waste land, but in Surrey it is difficult to frame or conjecture a reason that will account for, much less excuse this negligence. It will be seen from the following survey, that the soil of almost all the heaths might be planted with every prospect of success, and that there are very few of the commons which would not bear good crops of corn.

## *HEATHS.*

The greatest part of the heaths of Surrey lies in the west and south-west districts of the county, extending from Haslemere to Farnham, and from Farnham by Bagshot to Egham. In this wide extent there are very few spots of cultivated ground. There is also a considerable tract of heath land on the broad and flat part of the Surrey downs, between Ewel and Epsom on the north, and Riegate and Buckland on the south of the hills.

The general surface of the heaths in this county is very flat: Hindhead, in the neighbourhood of Haslemere, is perhaps the most elevated of the heath land.

The following particular account of the heaths in this county, is taken from the Quarto Report, drawn up by desire of the Board by Messrs. Malcolm, in 1794.

"The first of any considerable extent is situate about four miles south of Guildford, called Blackheath, containing 1000 acres of different coloured sands of various depths, producing nothing but short heath: its situation is high and exposed, and the greatest part so poor, that it is unfit for any thing but plantations of firs, but especially Scotch and larch. There are parts of it in which beech, birch, and chesnut, would grow well.

"Munsted Heath contains 220 acres of light sandy loam, covered with heath and furze, capable of being applied to various agricultural purposes; and its contiguity to Godalming would render it of great value.

" Hydon's Heath contains 450 acres, chiefly sand and gravel: some parts sandy loam. The skirts would produce good corn.

" Wormsley and Hamilton Heaths nearly of a similar soil, and contain 350 acres.

" Hindhead contains 3096 acres, chiefly sandy soil, although many spots are loamy; the whole of which might be most profitably planted.

" Frencham, Thursley, and Whitby, contain 5800 acres of deep sandy soil.

" Farnham and Crooksbury contain 3700 acres of deep sandy soil. The valuable plantations of firs on these heaths (already noticed), demonstrably prove to what a profitable purpose they may be applied.

" Tuxbury Hill contains 600 acres of similar soil.

" Bagshot Heath, including Romping Downs, Purbright, Windlesham, &c. contain upwards of 30,000 acres covered with short heath."

(Since the publication of the Quarto Report, Frimley, Walton, Weybridge, Redhill, Frimley, and Woking-heaths, in this part of Surrey, have been enclosed).

" South-east of Croydon is Addington Heath and Shirley Common, containing 300 acres: the soil a black land and loam, the whole of which, except the summits of the hills, is capable of producing barley, oats, turnips, artificial grasses, &c. and the hills might be profitably planted with firs, &c. It is at present covered with short heath and furze, and cannot be said to be worth more than 1*s*. 6*d*. per acre; but if enclosed, would find a rent of from 15*s*. to 20*s*. an acre.

" On the high turnpike road to Grinsted in Sussex, and a little beyond the twenty-fourth mile-stone, is

Blendley Heath, containing fifty acres of sour pasture; the soil is a deep stapled yellow clay.

"Pacon Heath nearly adjoining, consists of seventy acres of light sandy loam, covered with juniper, furze, and fern.

"Felcot Heath, north-west of Pacon-heath, containing 250 acres covered with heath; the soil a black sandy surface upon loam.

"Frogwood Heath consists of 200 acres of light sandy soil, covered with heath, furze, &c.

"Headly Heath may contain about 900 acres of various soils, such as sand, loam, gravel, and clay, and which is at present covered with furze, heath, and fern; it is, however, well calculated for the growth of corn, turnips, and artificial grasses."

The whole of these extensive heaths may be fairly considered, in their present condition, as of very insignificant value. A very few poor looking cattle and sheep are seen scattered over some of them, picking up a scanty support with much difficulty and labour. Turf is perhaps the produce they afford in the greatest abundance, and of the most value: in the low swampy parts about Bagshot, Windlesham, Frimley, and Chobham, peat is cut: though as the spots that supply it are few, the time it takes to renew very long, and the demand for it great, it is wearing out fast. Some women in the neighbourhood of Bagshot employ themselves in cutting long heath where it can be got, for besoms, by which they make about 3*s.* a week. Others are employed in gathering the blayberry or whortleberry for sale. Such are the miserable productions and the trifling employment which these heaths in general afford.

In some of the western heaths, however, a more profitable mode of occupation has been long followed—one which ought to be withdrawn from more fertile soils, and confined to the wastes. Fish-ponds are common in the western heaths, and certainly pay better than any other mode of employing the land ; but as their extent must necessarily be confined, there is still room for plantations : and probably, if the hollows were made into fish-ponds, and the other parts of the heaths planted with the Scotch fir, or larch, they would yield as much profit as could well be expected from them *.

### *COMMONS.*

The following full and particular account of the commons in Surrey, is taken pricipally from the Quarto Report, already mentioned.

*Kennington Common.*—This common contains only about 20 acres ; yet from its advantageous situation, so near the metropolis, it might, by proper management, be made extremely valuable. "At present, it is common to all cattle, without stint, belonging to those parishioners who reside within the Prince of Wales Liberty (whose property it is), and who pay a certain stipend per head, which sum goes towards defraying those expenses which the keeping up the fences necessarily incurs. It is shut during the winter six months, and opens again in May ; but it is no sooner opened, than the

---

* Fish-ponds are found in many other parts of Surrey. The dams are generally formed of stones and earth : some of them of chalk. In order to prevent the escape of the small fish, several dams are formed one below the other; so that if the small fish get over the uppermost dam, with the waste water or in a flood, the lower dams prevent them from getting farther. Carp is the principal fish with which they are stocked. Mr. Collins, near Godstone, generally sends 4000 of these fish annually, to the London market.

Google

the number of the cattle turned in is so great, that the herbage is soon devoured, and it remains entirely bare the rest of the season."

*Dulwich Common*—Contains 200 acres of a strong clayey loam. The pasture is poor and sour, for want of being properly drained; and from the same cause, it is very injurious to sheep.

*Norwood Common*—Contains 600 acres of very various soils, principally a sandy loam upon clay, or a poor hungry gravel: "250 acres is called an enclosed wood; no trees are however suffered to grow for timber, because they are cut or lopt every ten or eleven years. The other part of Norwood consists of straggling oak-pollards, bramble, furze, and fern; yet capable of producing as good timber, corn, and pasture, as any part of the county. There are to be sure many springs in it; but the whole may, with great care, be effectually drained."

*Brixton Common, or Rushey Green*—"Contains 150 acres of good loamy soil; but being a flat, and without ditches, the water has no way of draining off, and therefore produces nothing but rushes and sour pasture. This common is capable of being drained with great ease."

*Streatham Commons.*—"To the west of Streatham, is a common of 250 acres—a loamy soil on gravel, great quantities of which have been dug out for gentlemen's gardens, as well as for repairing the roads. But from the little attention that is paid to the preservation of the upper soil, it is left in a state unfit for vegetation:

tion: some of the pits are left as they were dug out, and consequently are full of water: other parts are covered with furze and coarse pasture. But the growth of the elm and oak timber upon this common, shews to what a profitable purpose it might be applied. To the east, adjoining to Streatham, and in front of the Duke of Bedford's house, is a small common of good loamy soil; but being at present in middling pasture, and appearing only a handsome lawn to the surrounding gentlemen's villas, it cannot be applied, perhaps, to a better purpose."

*Waddon Marsh*—West of Croydon, contains 15 acres of good land, an enclosure of which might easily be effected, as it is in the hands of only a few proprietors: the pasture is at present only middling. It belongs to the see of Canterbury.

*Mitcham Common*—Contains "550 acres of various soil, as loam, clay, and gravel: the present produce is only a sour pasture, overrun in many places with heathy furze, &c.; and although the situation is bleak, and several parts of it wet, yet it might be effectually drained, and produce good crops of corn; for the adjacent lands of the same quality, but in an enclosed state, lett at 40*s*. per acre; and there would be no difficulty in letting the whole of this common upon lease, at 20*s*. per acre, provided it was enclosed."

*Hamsey Green*—East of Riddlesdown, contains "about 100 acres of very rich pasture: the soil, a deep-stapled loam."

*Wallingham Common*—"Near the last, contains 500 acres of deep rich-stapled loam upon a chalk, but very much overstocked."

*Cattesham Common*—" Near the 16th mile-stone, on the road to Godstone, contains 300 acres of light sandy loam upon gravel: sweet pasture, wherever the furze, fern, &c. is kept under."

*Limpsfield Common*—Between Godstone and Westerham, in Kent, " contains 480 acres." The west side of it is a poor sand; but towards the middle, the soil improves to a loam of a good staple. " Heath, furze, and in some parts, beech, birch, and oak coppice-wood, thrive well on it; but the copyholders claiming a right to turn in cattle, as well as a privilege of weeding the wood," prevents the timber from reaching any considerable size.

*Eden Common*—Adjoining the above, " contains 70 acres of wet pasture, which, by draining, levelling the ant-hills, and altering the course of a very crooked brook, might be converted into good land."

*Stafford-wood*—" Two miles to the south, contains 150 acres of loam, on a strong clayey subsoil. Part of this common woodland is overrun with brambles, briars, &c.: other parts of it consist of oak, beech, and birch underwood, with some timber of a large size, but by no means under a good profitable system. A few years ago, several were cut down, containing about two loads of timber each tree: a strong proof this, how much it is to be lamented, that the freeholders and copyholders should have a right to turn on an unlimited number of cattle of every description, to the utter destruction of the young and tender saplings."

*Lingfield Common*—At the 25th mile-stone on the Grinsted road, contains 200 acres of pasture, capable of great improvement by enclosing, the soil being a good loam.

*Hedge-Court Common*—Contains 160 acres of light sandy and gravelly soil, and is covered with low heath.

*Copthorn Common*—Containing 750 acres joining the above, is a poor black sand on a yellow tough clay: the lower parts of it are boggy, but could easily be drained, having a brook running through it: it is covered with the same kind of heath as Hedge-court Common. The beech and birch thrive well in the hedge-rows that bound it, and might therefore, as well as the larch, be planted with success on the higher parts of it.

*Horley Common*—In the Weald, contains 600 acres of deep and moist clay, very fit for the growth of oak timber, if it were enclosed, and laid dry by proper drains. At present, this, like most of the other commons in the Weald, is often covered with water in the winter time: the pasture, of course, is sour and unwholesome, and the sheep that feed on it are very subject to the rot.

*Lowfield and Westfield Commons*—Contain 230 acres of loam, of a very middling quality: "some parts are wet; but dividing them with proper ditches, would effectually drain the whole. The thin and poor herbage barely keeps alive a few cattle and sheep.

*Wetherhill*—In the parish of Nutfield, contains about 60 acres of good soil; but from the want of draining, the pasture is neither so abundant, nor so good, as it would otherwise be.

*Smallfield*—Containing about 80 acres, is similar in soil and produce to the former.

*Outwood Common*—" Contains 400 acres of poor land, consisting of sand, gravel, and some loam, covered with furze, heath, and bushes, with a small quantity of young timber thereon: some parts of it are wet, and very boggy; and there have been instances where cattle, which at times have been suffered to remain there, have been lost."

*Red-hill Common*—" About one mile and a half from Riegate, contains 450 acres: the low parts of which are a strong clay, and afford at present tolerably good pasture, notwithstanding it is much overrun with furze: the upper or hilly parts are composed of a rich sandy loam, well calculated to produce all kinds of grain in abundance. Its proximity to Riegate, would render an enclosure very desirable."

*Riegate Common*—Contains about 150 acres of sandy loam, covered with furze.

*Cadbrook*—Containing 160 acres, is of a similar soil, and in the same condition.

*Holmwood Common*—About 400 acres, seems to partake of the clay of the Weald, and of the sand about Dorking, between which it lies: is well adapted on the south, or stronger soiled side, to the growth of timber, or over the whole of it, to pasture or corn.

*Leith-hill and Hurtwood*—Which lie nearly contiguous, and stretch a considerable way from west to east, between the Weald and the sandy valley to the south of the chalk-hills, contain 3200 acres: in this extent there is a great variety of soil: much of Leith-hill is similar to Holm-wood; but a great part of Hurtwood, especially on the higher parts of it, between Shire and Ewhurst, consists of a worthless white sand, covered with short stunted heath: perhaps the wildest and bleakest part of the county lies between the two places just mentioned.

*Walton, Kingswood, and Bansted Commons*—Lying together, contain about 1500 acres. The soil on the upper part is in general very poor, and fit for nothing but planting: other parts of these commons, however, might be employed more profitably. It is expected that Kingswood-common will be enclosed soon.

*Sutton Common*—Partly loam, and partly strong clay, contains 250 acres; and from the good pasture which some of it yields, the advantage that would accrue from enclosing and dividing it is evident.

*Cheam Common*—Partly brick-earth and partly clay, contains 320 acres.

*Epsom, Leatherhead, and Ashted Commons*—Join together, and contain upwards of 1200 acres. The soil is various, but in general a moist clay, well suited either for timber or pasture, and from its vicinity to Epsom, capable of great improvement at an easy expense: at present, "the greater part of it is covered with furze, brambles, hawthorn bushes, large quantities of hornbeam and other pollards."

*Fetcham Common*—"Contains 250 acres of light loam, covered with furze, heath, &c."

*Shackleford Common*—Containing 150 acres of sandy soil of middling quality, is in the same state as the preceding.

*Addlestone Common*—Contains 150 acres of rich loam, affording good pasture, but standing much in need of draining.

*Horsham Common*—Containing 200 acres of a loam of moderately good quality, is covered with furze and heath, and in some parts very wet.

*Kingston Common*—"Contains 430 acres, at present covered with furze, brambles, &c. As the soil is a loam on gravel, it would pay well for being enclosed."

*Norbeton Common*—Contains about 320 acres of a similar soil.

*Wimbledon and Putney Commons*—Adjoin without any division, and may contain 1000 acres. The soil is various, consisting of stiff clays, loam, sand, and gravel:

Digitized by Google

gravel: 200 acres of these commons may be covered with hornbeam and oak, pollards and brushwood, &c.; the rest is overrun with furze; but where any considerable portion is cleared, the pasture is sour and unwholesome, for want of proper drains to carry off the water. The great road from London to Portsmouth passing over these commons, the easy distance from the metropolis, but above all, the number of gentlemen's seats which nearly environ them, and the example which the present Earl Spencer has shewn, both as to the manner and the effect of covering such parts as might be agreeable with plantations—it is only matter of surprise, that they should so long have remained in their present uncultivated state.

*Barnes Common*—May contain 200 acres of light sandy loam upon gravel: some parts of it are wet in the winter, and covered with furze. Part of this waste was enclosed for the use of the workhouse, and it now produces all kinds of vegetables in great abundance, together with corn and artificial grasses.

*Wandsworth Common*—Consisting of about 350 acres of good loamy land upon gravel, is wholly covered with furze, well adapted to the growth of grain and timber.

*Battersea and Clapham Commons*—Adjoin, and compose about 50 acres of very light loam upon gravel, in many parts very shallow, and consequently very unfavourable to horticulture; it however yields an abundance of gravel for the roads and gardens, fern and furze for the baker; and under these circumstances, it may be as productive in its present state as if it were enclosed. It affords an agreeable and safe retreat for many of the most opulent merchants and bankers of the city of London (perhaps of the world), which its contiguity to the metropolis also makes desirable, and who have fixed their residence here. It is not, therefore, to be wondered at, that these commons should be circumscribed, and that the price of land, otherwise not worth 5*s.* per acre, should have found a value perhaps no where paralleled out of the metropolis. The only thing wanting to complete the scenery of the situation, would be, to destroy the greatest part of the furze and fern, and lay it down to grass; to intersperse evergreens among those forest trees that are already planted there, and to scatter a few more clumps upon a better scale: the whole would then have the appearance of an ornamental paddock.

Since the Quarto Report was drawn up, in 1794, the following commons have been enclosed:

*Penge Common*, adjoining to Norwood, containing 300 acres.

*Croydon Common*, lying very near the town, containing 350 acres.

*Ewel Common and Marsh*, containing about 350 acres.

*Fetcham and Bookham Commons*, adjoining, about 1100 acres.

*Clandon Common*, containing nearly 150 acres.

*Cobham Common*, &c. containing about 1300 acres[*].

*Pease*

---

[*] The following is the allotment of these commons:

| | *A.* | *R.* | *P.* |
|---|---|---|---|
| To the old estates, - - - - - - | 822 | 1 | 10 |
| One sixteenth to Thos. Page, Esq. as lord of the manor, | 48 | 3 | 11 |
| To Mr. Page, in exchange for part of his estate, made into a public road, - - - - - - - | 1 | 1 | 3 |
| Carry forward, - - - - - | 872 | 1 | 24 |

Brought

*Pease Marsh*, between Guildford and Godalming, containing about 800 acres.

*Esher Common*, containing 500 acres.

It is easy to ascertain the value of the commons, when they are enclosed; but it is extremely difficult to say what they were worth, or rather what they paid, per acre, while in a state of commonage: it is not, however, of much consequence to determine exactly the relative value, as something more than a conviction of their increased value appears necessary, to gain the consent of those that are interested in their present state.

### *COMMON-FIELDS.*

Perhaps the great extent and present appearance and cultivation of the common-fields in Surrey, are a greater disgrace to the agriculture of the county, even than the number and situation of the heaths and commons. In the latter, we see merely land neglected, and in that state in which most land must be, on which no labour and skill have been expended: in the former, we can *trace* marks of labour—but of labour misdirected,

---

| | *A.* | *R.* | *P* |
|---|---|---|---|
| Brought forward, - - - - - - | 872 | 1 | 24 |
| For a public gravel-pit, - - - , - - | 3 | 0 | 0 |
| For the exclusive use of occupiers of cottages under 10*l.* a year, - - - - - - - - | 300 | 0 | 0 |
| Sold to defray expenses, at from 10*l.* to 75*l.* per acre, - | 95 | 2 | 5 |
| Set out for roads, - - - - - - - | 44 | 0 | 10 |
| Total, - - - - - | 1314 | 3 | 39 |

No person renting more than 10*l.* was to cut turf from the reserved 300 acres, under a fixed penalty.

and, in a great measure, thrown away: on the former, every expense that on enclosed lands produces good crops and a clean soil (and in some cases more), has been laid out, without producing any adequate return; on the latter, no money has been laid out, no labour bestowed, and the return is certainly trifling, but as much as there was reason to expect. So far therefore as, on the common-fields, there is much money and labour thrown away, their existence may justly be regarded as more injurious and more disgraceful to the county than that of the commons and heaths.

When it is considered, in addition to this, that the common-fields require merely to be enclosed, in order to ensure their proper and judicious cultivation, and their full and adequate crops, while the commons require a very great expense to bring them even into the state in which the common-fields now are—the continuance of the latter seems much less excusable than that of the former. There must certainly be less difficulty, also, in procuring the consent of the proprietors of common-fields to enclose and divide *them*, than of the *commons* for the same purpose.

It should not be forgotten in considering this subject, that the soil, in almost every instance, is remarkably good; and that the situation of many of them is peculiarly favourable for the raising and disposing of crops, that pay the cultivator at the highest rate of agricultural profit.

All these considerations, it might have been imagined, would have been sufficient to have created an eagerness, or, at the very least, to have removed the unwillingness of the proprietors of common-fields to consent to an enclosure and division: not even these, however, nor even the prospect of the great advantages reaped by such enclosure and division, have had any general effect. The common-fields of Ewel have now been enclosed long enough, to enable the holders of them to reap the fruits of their expense and labour: they are *now* in general very clean, and productive of excellent crops: the common-fields of Epsom, immediately adjoining, of a soil equally good, on the other hand, are full of couch and other weeds, and consequently very far inferior in the quantity and quality of the grain they produce; yet the proprietors do not talk of enclosing them—do not even seem to wish it.

If the evils resulting from common-fields were solely confined to that portion of the ground which they occupy, their existence, though highly prejudicial to the community, might perhaps be endured with patience, as injurious in its immediate effects only to the proprietors: but when it is considered that they are the hot-beds of all kinds of weeds, which are from them scattered over the fields of the more attentive farmers, every person who holds land in their neighbourhood, has a just right to expect the removal of such a nuisance.

We shall follow the plan adopted with respect to the commons and heaths, of giving a particular account of the extent, soil, &c. of the most important common-fields, taken principally from the Quarto Report, already mentioned. As the whole number of acres of common-fields in the county, may appear less than the preceding observations give reason to expect, it is proper to observe that there are none, and never appear to have been any, in the Weald of Surrey: indeed, they were and are almost entirely confined to the district north of the chalk-hills, though a few of them lie on the sloping ground on the chalk, very near to the junction

Digitized by Google

tion of it with the northern clays. Hence it is evident, that they are most numerous in that part of the county, where both the soil and situation are best calculated to render them valuable and highly productive, if they were enclosed, and properly cultivated.

The quantity of common-field land, from Beddington and Wallington to Carshalton, is estimated at 1200 acres, the major part of which, but especially the lower land, is good, being a kindly loam upon gravel, or upon chalk; and taken in the aggregate, produces very good wheat, oats, barley, rye, clover, and sainfoin. Notwithstanding, however, that the greatest part of this land is in the hands of a few proprietors, principally opulent gentlemen, who would most readily join in a fair and equal division; yet from the nature of the tenure of those lands, the intermixture of their property, and some other trifling obstacles, they have hitherto been prevented from effecting so desirable an object. In a field perhaps of 200 acres, it is no uncommon thing to find ten proprietors holding 20 shares or lots, many of which are at a distance from each other, and still farther from the principal part of the farm. The above-described average about *14s.* per acre, although there are some that fetch *1l. 5s.*, and a few particular situations that realize as high as *2l.* per acre; but that is no criterion, being close to some town or village. The whole of these lands in a state of enclosure, would, from their proximity to Carshalton, &c. lett at *1l. 5s.* to *1l. 10s.* per acre.

From Carshalton we proceed to Sutton and Cheam, where the soil for the most part is good, although shallow, and the substratum chalk. The quantum of land in this neighbourhood in a state of common field, is said to amount to 2000 acres. Its immediate contiguity to several lime kilns, enables the proprietors of those lands to dress them at an easy rate, and therefore they are perhaps as productive as lands under such tenures can be. Present rent 10*s*. per acre; but enclosed land of the same quality and in the same neighbourhood, brings from 1*l*. 10*s*. to 2*l*. per acre.

Epsom Common-fields contain about 800 acres. Nearly one half of the low lands are a deep loam; the other part, shallow loam upon chalk. Present rent 13*s*. per acre. The former land, as being so much deeper, is peculiarly adapted to the growth of sainfoin. If this land was enclosed, the sainfoin might be cultivated to very great profit.

Leatherhead Common-fields contain 2000 acres of good loamy land; and assimilating so nearly to the preceding, it is unnecessary to add any thing farther as an argument to induce the enclosing of them.

Ashted Common-fields consist of about 700 acres of similar soil: its proximity to the downs would in a state of enclosure, render it highly valuable; its present rental averages about 9*s*. per acre.

Fetcham Common-fields are about 150 acres of good loam; present rent 7*s*. per acre.

Egham Common-fields contain about 300 acres of rich light loam, well adapted to the growth of corn: its ready communication to the Thames, its contiguity to Egham, and as we before observed, the richness of its soil, all conspire to make enclosures desirable. The right of commonage is unlimited: and under those restrictions it nevertheless letts from 1*l*. to 1*l*. 5*s*. per acre, but would lett directly, if enclosed, for 1*l*. 10*s*. to 2*l*. 10*s*. per acre.

Hythe fields contain about 250 acres of good loamy land upon gravel: they are in small parcels, the property of about thirteen persons, who have an unlimited right of common. The present rent is 16*s.* to 20*s.* per acre, but would fetch from 30*s.* to 50*s.*

Thorpe Common-fields contain about 350 acres of good loamy soil. Present rent is 16*s.* to 20*s.* per acre, but would lett for 30*s.* to 40*s.* per acre.

Mortlake, Putney, Wandsworth, and Battersea, are said to contain about 1840 acres of light loamy soil. Present rent 1*l.* 5*s.* per acre, which if enclosed would find a rental of 1*l.* 10*s.* to 2*l.* 5*s.* per acre. In examining Battersea fields, perhaps no part of the county (and we may almost include the kingdom too), exhibits in stronger colours the absolute necessity of enclosures. The lands for the most part lie in narrow slips, which is the general custom, are ploughed in one uniform way, and are nearly sown with one uniform round of grain, without intermission, and consequently without fallowing. This, its proximity to the metropolis enables the tenants to do, by the great ease with which they get dung and manure; but notwithstanding the facility with which they can always work this soil, yet it is so invariably foul, that in this respect Battersea-fields are become almost proverbial. It is in vain that one man is at great pains and expense to cleanse and purify his lands, if his next neighbour will not do so too. The lightness of the soil, and the quantity of dung which is continually bestowed upon these fields, at the same time that it makes them productive in grain, tends also to encourage the growth of couch and other noxious weeds. Were they enclosed, they would in all probability be appropriated to horticultural purposes, for which the land and situation are so peculiarly adapted: in that case it would fetch from 3*l.* to 4*l.* per acre.

Runnymead contains 160 acres of good strong soil, and at present letts for 20*s.* per acre, tythe free. It is the property of ten persons, and in small parcels. After the 12th of August it is common to all the parish, who turn on an indefinite number of cattle until March, when it is shut up again; but being subject to be flooded in the winter, it becomes poached by the number of cattle that are on at that time, to the destruction of the herbage and consequent loss to the proprietors. This would be remedied by an enclosure, and would be worth from 40*s.* to 60*s.* per acre.

Yard Mead and Long Mead contain about 100 acres of similar soil, and under similar regulations, and of nearly the same value.

Since the Quarto Report was published in 1794, the following common-fields have been enclosed.

*Croydon*, containing about 300 acres.

*Ewel*, containing between 600 and 700 acres.

*Bookham*, containing 450 acres.

*East and West Clandon*, containing nearly 300 acres.

*Meroe and Horsehill*, containing about 500 acres.

*Send Common, Broad Meadow*, containing 365 acres.

*Scotches Common Meadow*, in the parish of Send, containing 50 acres.

*Send Little Mead*, containing 70 acres.

It is more easy to determine the rise of value by the enclosing of the common-fields than of the commons: the general average of the common-fields just enumerated, before they were enclosed, was about 10*s.* per acre: whereas they now lett, on an average, at about 23*s*. per acre*. There is reason to believe that the rise would be nearly in the same proportion, if the remaining common-fields were enclosed: the common meads would probably rise less, since pasture land in commonalty, is hardly so much abused or so unprofitable as tillage ground under the same tenure: but, on the other hand, there can be no doubt that the common-fields of Battersea, Wandsworth, &c. near the metropolis, would if enclosed, rise in their rent at a greater proportion than those lately enclosed.

Before quitting this subject it may be proper to give a list of the principal common-fields, commons, and heaths, with the computed number of acres in each; as such a list exhibiting the whole extent together, will probably strike more, and lead to reflection, so as to produce some good effects in those interested.

| *Common-Fields.* | *Computed Acres.* |
|---|---|
| Beddington, Wallington, Carshalton, | 1200 |
| Sutton, Cheam, | 2000 |
| Epsom, | 800 |
| Leatherhead, | 2000 |
| Ashted, | 700 |
| Fetcham, | 150 |
| Egham, | 300 |
| Hythefield, | 250 |
| Thorpe, | 350 |
| Mortlake, Putney, Battersea, &c. | 340 |
| Runnymead, &c. | 260 |
| | 8350 |

---

* For further particulars respecting the increased rent and produce by enclosing the common-fields, see Chap. VI.

*Commons.*

## *Commons.*

| *Commons.* | *Computed Acres.* |
|---|---|
| Dulwich, | 200 |
| Norwood, | 600 |
| Brixton, | 150 |
| Streatham, | 250 |
| Waddon, | 150 |
| Mitcham, | 550 |
| Addington and Shirley, | 300 |
| Hamsey, | 100 |
| Wallingham, | 500 |
| Catterham, | 300 |
| Limpsfield, | 480 |
| Staffords-wood, | 150 |
| Lingfield, | 200 |
| Hedge-court, | 160 |
| Copthorn, | 750 |
| Horley, | 600 |
| Lowfield and Westfield, | 230 |
| Wetherhill and Smallfield, | 140 |
| Eden, | 70 |
| Out-wood, | 400 |
| Red-hill, | 450 |
| Riegate, | 150 |
| Cadbroke, | 160 |
| Holm-wood, | 400 |
| Leith-hill and Hurtwood, | 3200 |
| Walton, Kingswood, and Bansted, | 1500 |
| Sutton, | 250 |
| Cheam, | 320 |
| Epsom, Leatherhead, and Ashted, | 1200 |
| Fetcham, | 250 |
| Carry forward, | 14,160 |

Brought

| *Commons.* | *Computed Acres.* |
|---|---|
| Brought forward. | 14,160 |
| Shackleford, | 150 |
| Addlestone, | 150 |
| Horsham, | 200 |
| Kingston, | 430 |
| Norbeton, | 320 |
| Wimbledon and Putney, | 1000 |
| Barnes, | 200 |
| Wandsworth, | 350 |
| Battersea, Clapham, | 50 |
| Egham, | 400 |
|  | 17,410 |

*Heaths.*

|  |  |
|---|---|
| Blackheath, | 1000 |
| Munsted, | 220 |
| Highdown, | 450 |
| Wormsley and Hamilton, | 350 |
| Hindhead, | 3096 |
| Frensham, Thursley, and Witley, | 5800 |
| Farnham and Crooksbury, | 3700 |
| Tuxbury-hill, | 600 |
| Bagshot-heath, &c. | 31,500 |
| Blindley and Bacon, | 120 |
| Felcot, | 250 |
| Frogwood, | 200 |
| Hedley, | 900 |

|  |  |
|---|---|
| Acres of heath, | 48,180 |
| —— of commons, | 17,410 |
| —— of common-fields, | 8350 |
|  | 73,940 |

Within these twelve or fourteen years, there have been enclosed and improved, of

| | Acres. |
|---|---|
| Heaths, about | 4500 |
| Commons, about | 4900 |
| Common-fields, | 2700 |
| Total enclosed, | 12,100 |

So that about one-seventh part of all the waste lands have been enclosed within the above period; viz. rather less than one-eleventh part of the heaths, rather more than one quarter of the commons, and about one-fifth part of the common-fields.

It is impossible, and therefore idle to attempt, to calculate how much would be added to the rental of the county, by the improvement of the 73,740 acres still in a rude state: but from the success of the plantations on Crooksbury-heath (already noticed), we may justly infer, that even the worst land will pay well by judicious improvement.

*Downs.*—These are to be found on every part of the chalk-hills of Surrey except the eastern and western extremities: at the former, the chalk-hills are extremely broken into vallies, across nearly their whole breadth; at the western extremity they form merely a narrow ridge, steep on both sides: at both these extremities, as well as on the more precipitous southern side, the chalk-hills are almost entirely under the plough, so that the principal and most extensive Downs, lie either on the flat or on the northern slope. The most remarkable Downs are those of Bansted, Epsom, and Clandon: the first was formerly noticed for its sweet mutton, the last is now considered as affording better feed than any of the other Downs: probably because it is not stocked so hard.

As a right of pasture on the Downs is usually attached to the neighbouring farms, and the practice of folding the sheep fed on the Downs during the day, upon the arable land during the night, is very common, their value must be estimated not only from the feed which they afford, but also from the manure which they supply. It is, however, impossible to come at all near the truth, on the first point, so as to determine how many sheep per acre the Downs will feed; for in the first place, the extent of any particular sheep-walk is not accurately known; and in the second place, the number of sheep is continually varying. Nor is it easy to determine the value of the Downs to the arable land; as at the time the sheep are folded they generally get something to eat before they go to the fold, besides what the Downs have afforded them.

But though it is impossible exactly to fix the value of the Downs, yet a slight inspection of the grass which the best of them yield, will probably convince those who contend that they ought to be broken up, that a certain advantage would thus be destroyed for the sake of a very uncertain profit. Few kinds of soil support such a close, healthy, and nourishing sward as the Downs do: and few kinds of soil pay worse while under the plough, or are so difficult to be converted into grass again, if once broken up. Even if we suppose that they were broken up merely for the purpose of growing green crops for sheep feed, still it may reasonably be predicted, that their produce in this state would be much less certain than it is now: under tillage they would suffer from the dry weather, whereas under their old sward, the most scorching summer has scarcely any effect upon them. Where the advantages resulting from breaking them up are so very uncertain, and the profit from their present state so evident and totally void of expense, it assuredly would be the height of folly to make any change in them, at least upon a large scale.

But though it does not appear prudent to recommend the tillage of the Downs, yet considered merely as a sheep-walk, they might be much improved. On many parts of them brushwood, &c. is to be seen; by removing this, and bringing up a closer and sweeter sward in the spots where the coarser grasses prevail, by the application of lime, the extent and quality of the pasture would be increased and improved, and consequently they would be rendered capable of supporting a greater number of sheep, and of manuring a greater quantity of arable land. In two other respects the system pursued on the Downs might be amended: they are in general overstocked, and too great a proportion of the manure is withdrawn from them for the use of the arable land: while, however, they are possessed by farmers who have also arable ground, little or no alteration can be expected in these points.

# CHAP. XII.

## IMPROVEMENTS.

### SECT. I.—DRAINING.

THE necessity for draining in Surrey, is not nearly so general nor so extreme as it is in many other counties. On the soils in the middle of the county, which lie upon a bed of chalk, it is of course not required. The clays of the Weald, and to the north of the chalk-hills, often require the surface-water to be drawn off, but are not in many places subject to springs: these are found chiefly at the junction of the chalk and clay; on the sandy loams to the south of the chalk-hills, and in those districts to the north of them where the sand and clay often intersect each other in the same field.

It is not to be expected, therefore, that where there is so little necessity for draining, there should be any peculiar or extraordinary skill in performing it: at the same time it is but just to say, that there are several instances in the county, where by drains judiciously applied and well made, the dryness and firmness of the land, and its consequent value, have been much increased. As almost every farm is well supplied either with thorns, with chalk, or with stones, proper for filling up the drains, open cuts are seldom made: on sheep farms these are also objected to, as dangerous to the sheep that graze in the fields where they are.

The

The practice of cutting off the source of springs, is by no means common, nor so well understood as it ought to be: too many farmers are content with preventing waters that issue from the springs, from spreading so far and to such a breadth as they otherwise do by hollow drains: the following is a detail of the process by which they are generally made.

*Depth.*—This depends upon a variety of circumstances: the depth that is found to be necessary, and to answer best in most parts of Surrey, is four or five feet. On some parts of the sandy district, and where the chalk and clay unite in the north of the county, it is often found advisable to make the drains from six to eight feet deep. The nature of the soil and subsoil, the declivity of the surface, and the quantity of water, must of course determine the exact and particular depth required for each drain.

In the Weald, where the object of draining is rather to clear the land from surface-water, less depth is required: in every case, the proportion between the breadth at top and at bottom, is carefully preserved.

The drains are filled with brushwood, sods, flints, chalk, and sometimes with bricks: in some places, stones, chalk, and brushwood, are all used.

When it is intended to use brushwood alone, the drain is made without any *shoulder:* such brushwood as will keep the drain most firm and open, is selected, and put in with great care and nicety; and over it, either the soil is immediately thrown, or there is an intermediate layer of straw. It is the practice of some farmers to lay poles of alder below the brushwood or thorns, in order to keep the water-course more securely and permanently open. The expense of filling a drain with brushwood, is from 6*d*. to 8*d*. per rod, where the materials are at hand, and can be easily procured.

Where it is intended to use sods or flat stones, the drain is made with a *shoulder*, on which they may be placed: some, however, prefer putting the sods into a drain made in the common manner, either loosely or well pressed, with the turf downwards. The expense of sod-draining is about half that necessary to fill a drain with bushwood.

Where chalk is employed, it is generally put on over the flints, which form the water-course; furze or brushwood is placed over the chalk, and the soil put over all: this mode, if a sufficient extent of channel is left, and the different materials are well selected and carefully put in, is perhaps the best that can be adopted.

A curious circumstance was mentioned to me by Mr. Drewit, of Send, which shews to how trifling a difference in point of firmness and tenacity, the water will give a preference in its course: he had neglected to fill up a drain as he was going on opening it: the consequence was, that the frost made the soil crumble down, and nearly fill the drain: he altered the course, but he finds that the old drain, though filled merely with soil rendered loose and porous by having been dug out, still draws tolerably well.

The number of drains to the acre, varies of course with the wetness of the soil, and the interest the tenant has in the ground: the latter circumstance too often renders the draining bestowed incomplete, either in the width and depth, or the number of the drains, or in the kind of materials used to fill them. There are instances in the county, however, where a complete and substantial drain has been made, at the distance of every two rods, at an expense of at least 7*l.* per acre.

It is not easy to calculate accurately, the expenses attending the different modes of draining: it has already been stated, that brushwood costs about 6*d.* or 8*d.* per rod, and sods about half that price: the expense of flints must depend upon the ease with which they are to be got, the distance they are to be fetched, and the quantity used: the expense in most cases is probably twice as much as that of brushwood. The other expenses are more easily ascertained: the labour is from 6*d.* to 8*d.* per rod; half that, or about 4*d.* per rod for putting in the plants or chalk; 1*d.* or 1½*d.* per rod, where furze, &c. is used; and 3*d.* for filling in the soil; or from 14*d.* to 16*d.* per rod, for labour alone.

The duration of the drain depends upon the materials, the soil, and the workmanship: sods last the shortest time; and flints are more durable than brushwood. When, however, the interest of the money expended is taken into the account, as it ought always to be, the farmer will probably find himself paid better by filling his drains twice with brushwood, than once with flints, in the same period. Another consideration will have weight on the farmer: by using the less durable materials, there is little chance that he is working for his landlord or his successor.

The good effects of draining are experienced and acknowledged wherever it has been tried. I heard of several instances in which ground that had been previously so very wet, that "snipes were shot on it," had by draining become firm and sound, and productive of excellent pasture. It is curious to observe, how the sour grasses natural to a wet soil, gradually leave it after it has been laid dry, and are replaced by more sweet and wholesome kinds. This was particularly noticed to me by Mr. Birkbeck, of Wanborough, in a field he had drained a few years before: the sour grasses, which formerly occupied every part of it, had now disappeared, except on the moist sides of the ditches.

In soils that consist of a very tenacious and close clay, the surface-water finds its way with great difficulty, and not till after a considerable length of time; and consequently, not till after it has soured the ground. The only remedy in this case is, to bring the drains near the surface, in order that the water may have but a very little way to penetrate; but as in this case it is impossible to plough the land to a proper depth, without disturbing and injuring the drain, it has been proposed to fill them up to the very surface with gravel: by being thus constructed, and at the same time cut in those parts of the field to which there was a regular and general declivity, the surface-water would be easily and quickly absorbed. The only objection to this mode is, that the plough would disturb the gravel; but whoever has observed the effect produced by a plough, when passing through gravel *of a small size*, must have remarked how little it is disturbed by it. At any rate, this mode is worth the trial, on soils through which the surface-water cannot penetrate quickly to a drain placed below the reach of the plough.

Digitized by Google

## SECT. II.—PARING AND BURNING.

As there is very little old pasture in this county, and what there is is seldom broken up, paring and burning is confined almost entirely to the new enclosures. It has already been remarked, that it is practised in some parts on sainfoin grounds, as an advantageous mode of preparing them for tillage.

The enclosures that have lately taken place in Surrey, have given the farmers there many opportunities of ascertaining the best modes of paring and burning, and the good effects resulting from it: with respect to the latter, they seem to entertain no doubt that, on all rough soils, encumbered with the roots of the stronger grasses, or of rushes, ferns, furze, &c. it is the only mode of proceeding, so as to get them into proper condition for the plough, in a reasonable time, and at a moderate expense: with regard to the propriety and advantage of it on ground covered merely with old grass, unencumbered with the roots of other plants, there seems not to be such a general or confirmed opinion. The fact probably is, that by paring and burning old sward, an advantage is gained in point of time, and by the ashes being thoroughly incorporated with the soil; while on the other hand, the action of the fire must certainly carry off part of the fertilizing property of the sward, which might have been preserved by other methods, less expensive, though more tedious.

It is indeed contended, that none of the fertilizing parts of the sward and roots are carried off by the action of the fire; but this may justly be doubted. We are much in the dark respecting the food of plants; but the analysis of them, as well as experiments of a clear and decisive nature, warrant us in believing, that the volatile parts of the sward and roots, carried off during the process of burning, are *at least* as fertilizing as the carbonaceous matter that remains behind.

This loss, however, is more than compensated for, by the speedy use which paring and burning enables the farmer to make of his rough encumbered soil. It may therefore be regarded as judicious practice, wherever the sward is in such a condition as to require more than one year's fallow to make it ready for a crop; or wherever, though it could be got ready in one year without paring and burning, the roots of the old plants remained useless, but harmless, in the ground.

*Depth.*—This depends upon the nature of the soil, and upon the depth of the roots of the grass, &c. On the thin, deaf, *duffy* soils of the new enclosures at Weybridge, Frimley, and the western heaths, the depth seldom reaches one inch; whereas, on the stronger soils, where the roots have penetrated deeper, and form a closer and firmer *net-work*, the depth is generally about two inches.

If the season proves dry and windy, the sods, which are laid by the breast-plough with the turf downwards, will be sufficiently dry in six weeks or two months; but if the season prove rainy, or even not very dry, it is found necessary, either to turn the sods frequently over, or to set them up on each other, so that the wind may penetrate and dry them.

*Burning.*—As soon as the turf is found to be sufficiently dry, it is piled on some straw, in such a manner that, when the straw is set fire to, the combustion may be slow and smothering: this will be best effected. if the turf is burnt when it is rather under-dry. As the quantity *certainly*, and *probably*, in some respects, the quality of the ashes, depend upon the kind of combustion that is kept up, great attention and constant watchfulness are requisite during this process, in order that as little as possible may be carried off by the fire, and that all the sods may be burnt in an equal degree.

In some parts of Surrey, the sods are burnt as they lie, without being piled up in heaps: as soon as they are found to be sufficiently dry, straw is regularly placed under the different rows of turf, at certain distances, which, being set fire to, consumes the turf from one end of the row to the other.

This mode is certainly attended with some peculiar advantages; but it may justly be questioned, whether, on the whole, it is so advisable as the other: there is by it a saving of the labour necessary to pile the turf; the ground is more equally covered by the ashes, than it could possibly be by the most careful spreading of the burnt piles; and, if the action of the fire can in any respect benefit the soil, this benefit is thus more equally distributed. On the other hand, a greater surface of turf is thus exposed to the air—of course, a greater proportion of the fertilizing virtues of it must be carried off; and, if the ashes procured this way, and by the common mode, from the same quantities of turf, could be weighed or measured against each other, it would probably be found, that there was a deficiency by this method*.

---

* The quantity of ashes got from an acre of turf must vary with the depth of paring, with the closeness and thickness of the sward and roots, and with the attention bestowed on the piles while burning: 40, 50, 60, and sometimes 70 loads of ashes have been got from an acre.

*Spreading.*—The general method is, to spread the ashes as quickly as possible after the turf is burnt, and immediately to plough them in with a shallow furrow. I met with but one exception to this practice: Mr. Kendal, steward to the Duke of York, at Oatlands, prefers carting off the ashes, ploughing the land, and then spreading them. He says, that on the light open soil on the Weybridge new enclosure, the ashes are too apt to sink below the reach of the crop, even without ploughing; and therefore, in order to keep them near the surface, at least till the first crop can derive advantage from them, he adopts the method already mentioned, though it is attended with more labour and expense than the common one.

It may however be doubted, whether ashes, or any other manure, would ever sink below the reach of a crop, if the soil were always ploughed a proper and regular depth. Even allowing that such manures as are specifically heavier than the soil on which they are spread, would necessarily sink into that soil as low as it was moved and opened by the plough, yet the next ploughing, if it were of the regular depth, would again bring the soil near the surface, or at least within the reach of the roots of the plants. If the common opinion be true, that ashes ought to be spread immediately, as otherwise they would lose some of their fertilizing qualities, then Mr. Kendal's mode is certainly wrong; or at least, it may fairly be questioned, whether a greater proportion is not lost by the ashes lying so long unspread, than would be by their gradually sinking below the reach of the crops.

*Season.*—Spring is the time when the ground is pared

Digitized by Google

pared and burnt; and the earlier the operation is begun, the better, as then there is sufficient time to dry and burn the turf, and take a crop the same season.

*Crop and Course.*—Turnips are almost in every instance taken as the first crop after paring and burning. It is found to be a certain, and generally a large crop, less liable to be attacked by the fly than when sown after any other preparation. Barley is generally taken after the turnips; then clover and wheat: the crops, however, that succeed turnips, vary a good deal, at least in the order in which they are taken.

In some cases, especially where the land is too strong and wet for turnips, the ground is fallowed after the ashes are spread, and wheat is sown. Where it is not thought advisable to take a crop of turnips, tares are however considered a preferable first crop to wheat. It is said, that the grain reaped from land that has been pared and burnt, ripens earlier, and is of better quality, than that from other land. That it may be better than that from land which has been long under the plough, and which is probably foul and poor, is not to be wondered at; but there is good reason to doubt, whether it will be earlier or better than that on land lately taken up from grass by the plough, which is clean, and in good condition.

*Expense.*—Sometimes all the different operations of paring, burning, and spreading the ashes, are undertaken by the same people: the expense of the whole is from 35*s*. to 56*s*. per acre, varying with the state of the sward and the depth of the paring: where there are many strong roots of furze, &c. and also many stones under the surface, the work of paring is very hard; but where the soil is merely covered with old sward or with heath, the work is comparatively easy.

When there is a separate agreement for the burning and spreading of the ashes, the price given is from 5*s.* to 6*s.* per acre.

*Profit.*—It is not easy to ascertain exactly what the profit is: if the effects of paring and burning were visible in the goodness of the crops for several years, the profits, considering the smallness of the expense, would be great; but owing, principally perhaps, to over-cropping, or an injudicious rotation, and it may be, partly to the unavoidably exhausting effects of the operation itself, it is seldom that so many crops can be taken with safety and profit after it, as after old grass land, broken up in the common method by the plough*. This is not the only instance in agriculture, in which, by expecting and endeavouring to get too much from a particular process, the farmer has reaped less than it would otherwise have afforded; and thus brought it into bad repute, merely by acting on a false estimate of its advantages.

---

* Of the profit attending the paring and burning of new land, encumbered with the roots of brushwood, &c. there can be no doubt; the doubt expressed in the text, relates solely to old pasture. At the same time, the profit attending paring and burning the former kind of land would certainly be greater, if greater care were shewn in the mode of cropping it.

## SECT. III.—MANURING.

The vicinity of the northern parts of Surrey to the metropolis; the goodness of the roads; the necessity the farmers are under of frequently sending their carts to "town;" and the cheapness and facility of carriage afforded by the Thames—have introduced into this county, perhaps, a greater variety of manures than are to be found in most others. When we pass, however, into the heart of the Weald, where the distance from the metropolis is much more considerable—where the roads are heavy and bad, and where there is no advantage of water-carriage—we find very few kinds of manures employed.

Besides manures properly so called, the immense quantities of lime and chalk in the county are applied very generally in every part, but more particularly in the Weald; partly from the scarcity and want of variety of manures, but principally because calcareous substances are found to be peculiarly favourable to its tough and cold clays.

Before entering into a particular detail of the application and effects of each separate kind of manure used in Surrey, we shall mention the general rules followed by the most intelligent and experienced farmers, with regard to their management and use.

The most striking and remarkable general rule is, to form mixens, or composts, of all their richest and strongest manures: these composts are no doubt to be met with in almost every county in the kingdom; but in Surrey they are considered much more indispensable, and are in much greater abundance, than in most other counties. We shall probably be able to trace the origin and cause of this economical practice, by examining the particular part of the county in which it was most likely to take its rise, and in which, even at present, it is much more common than in the other parts.

By far the greatest number of these composts are to be found in the more immediate neighbourhood of the metropolis; and here, it is highly probable, the idea of making them first took its rise. Many of the kinds of manure procured from London, are so very powerful, that either the desire to prevent the waste of them, or the experience of their bad effects when spread on unmixed, like common stable dung, would soon lead to the plan of forming composts.

With respect to the general rule followed in the application of their manures, the best of the Surrey farmers seem at present passing from the old system of laying all their manure on to their fallows, to the more judicious and beneficial plan of applying it to the fields intended for clover, or other green crops: some of them are also in the habit (as has already been remarked) of laying it on *twice* during the rotation, instead of the old plan of laying it all on at once; and thus they both secure the more equal distribution of it among the different crops, and lessen the exhaustion of it by the atmosphere.

Such are the general rules, deserving of commendation and imitation, pursued by the best farmers in this county: there are, however, other points of practice, with respect to manure, not so unexceptionable. The one that is perhaps the most common, and which, as being pursued more or less with every kind of manure, falls *now* under our consideration, is that of suffering the heaps of dung, lime, &c. to stand a long time before they are spread, and to be spread a long time before they are ploughed in.

Having thus cursorily noticed the most general practices, we shall now proceed to the particular consideration of each kind of manure used in the county.

*Marl.*—Towards the east and south-east parts of Surrey, there is a traditionary belief, that marl was formerly much used; and the pits and ponds found in those parts, are supposed to be evidences that such was really the case. But it may justly be doubted whether *marl*, properly so called, was ever found or used in this county. There is no doubt, a deal of impure calcareous earth is to be met with, even at some distance from the chalk-hills; and some of the chalk-stones are so much mixed with clay, that on exposure to a moist atmosphere, they moulder, and fall into pieces.

But even allowing that the *earths* formerly used, and still to be found, in the eastern and south-eastern parts of the county, have a just claim to the name of marls; as they are now laid aside entirely, there seems no necessity to dwell farther on them, than merely to observe, that there is every reason to believe that their weakness in many cases, and their injurious effects in others, influenced the farmers in discontinuing the use of them, as much as the less expense, and greater strength and profit of chalk or lime.

*Chalk.*—Chalk-pits or quarries are very abundant in Surrey; and as they are generally wrought without much expense or difficulty, the application of chalk is very general in all parts of the county, except the more immediate neighbourhood of London and the

Weald. In the latter, lime is considered as more proper for the tough and cold clays of that district; and in those parts where the different manures supplied by London, can be procured at an easy and short carriage, the chalk is at a considerable distance.

Besides other chalk-pits of less extent and note, there are pits at Croydon, Sutton, Epsom, Leatherhead, Bookham, Effingham, Horsley, Clandon, Stoke, Guildford, and Puttenham, on the north side of the Downs; and at Godstone, Caterham, Riegate, Mestham, Buckland, and Betchworth, on the south side.

There is some, though no very considerable difference, found in the effects produced by the chalk of several of these pits: this arises, upon examination, from the greater facility with which some kinds of chalk *fall* or *run*, compared with the degree of the same quality in others. At the same time there can be no doubt, that nearly in the proportion in which this quality exists, is the impurity of the chalk, as it evidently proceeds from the mixture of clay: but as the great object is, to get the chalk mixed intimately with the soil as speedily as possible, impure chalk which falls down readily, is properly preferred to chalk more pure, which lying in lumps unmixed with the soil for many years, is not only useless, but actually in the way of the plough.

Formerly, the application of chalk was confined to the stronger lands; but latterly it has been applied with equal, if not greater effect, to the light loams, and even to the sandy soils.

The number of bushels applied to an acre, varies very much: as it is considered as a manure which can do no injury, if it should not prove beneficial, and as it is procured at very little expense, there has been less scruple in laying very large or uncommon quantities of it on the land, than of any other kind of manure: 500, 600, 700, and even 800 bushels are often applied, even on light lands; and if the chalk mixes well with the soil, and is laid on ground not over-cropped and poor, its good effects generally bear no very inadequate proportion to its quantity.

The crops that appear to derive the greatest benefit from the application of chalk, are pease and clover, which are generally rendered more abundant, and improved in quality at the same time. The operation, however, is commonly slow, going on evenly, and for a considerable length of time.

*Lime.*—This is obtained by burning either the chalk, or the limestone, that is found near Guildford: most of the lime, however, is procured from chalk; that from the Guildford limestone goes principally to the clays on the borders of Sussex.

It has already been remarked, that lime is almost universally used in the Weald: indeed, considering the small quantity of manure made on the farms in this district, and the demand which the fallow every fourth or fifth year (according to the rotation) has for a dressing of some sort, lime may justly be regarded as the main dependence of the farmers of the Weald. Hence, on almost every large farm, there is a kiln for burning the chalk or limestone; and furze or brushwood is cultivated for that purpose.

The lime-kilns are commonly placed on the side of rising ground, in order that they may be filled with greater ease and dispatch. The old, and still the most usual form of the lime-kilns, is nearly cylindrical, tapering at both ends, something like a common barrel: a dome a dome has lately been added, with a hole at the top of it.

On the inside, near the bottom, there is a "bench," or base, on which the supporting arch of limestone is to be built: this "bench" goes entirely round the inside, except at the place where the mouth of the kiln is, which is about two feet and a half broad, and four feet high, in a kiln of the usual diameter of nine feet at bottom, and eight feet at top, and of the depth of 14 feet. The place where the chalk is put in, is opposite the fire-place, and is two feet wide and two feet high.

The great nicety and difficulty consist in building the main arch of limestone on the "bench," so as at the same time to be sufficiently strong to bear what is laid upon it, and sufficiently open to admit the air necessary for combustion. For this purpose, an iron grate, provincially an "iron horse," is set near the centre of the kiln; or instead of it, strong sticks are fixed in the ground: these support the arch while the workman is turning it, and enable him to form it with more completeness and strength than he otherwise would be able to do.

When the arch is completed to the usual height of five or six feet from the floor of the kiln, the larger pieces of chalk are piled upon the middle of it, and the smaller around the whole, or upon the top of the larger, till the kiln is full*.

Six waggon-loads of chalk are usually put on each kiln: the setting of it requires a man and a boy rather more than a day; the burning takes up from 24 to 36 hours, and requires the attendance of two men: from 500 to 700 faggots, or about 1100 or 1200 furze, are necessary to burn a kiln.

---

* In some parts of the county, bricks and tiles are burnt along with the lime; the bricks being placed upon the arch of chalk or limestone, and the tiles upon the bricks.

The whole expenses are usually reckoned to run about 10*l.*; but as the principal expense is the carriage of the chalk, the total expense must vary considerably, according to the distance of the kiln from the chalk-pits: kiln-faggots are generally about 15*s.* or 16*s.* per 100; the furze, about 7*s.* or 8*s.* per 100, where they grow; the price of the chalk varies according to its quality, and consequent greater demand; that at the Guildford pits is from 2*s.* 6*d.* to 3*s.* the waggon-load; at some of the other pits, it may be got for 1*s.* 6*d.* or 2*s.*

If the chalkstone is good and well burnt, it is reckoned that every waggon-load of chalkstone will yield two chaldrons of lime, of 32 bushels each; the quantity however varies, according to the goodness of the chalk, and the setting and burning of the kiln: the great art is to burn it so, that the lime shall neither have any "core," nor "run together."

Lime is burnt in many parts of the county for sale; and it is sold either by the whole kiln, or by the bushel: the price, of course, must depend chiefly upon the quality of the chalkstone, and the consequent quality of the lime, and upon the distance of the kiln from the chalk-pits: 11*l.*, 12*l.*, and even 14*l.*, are not uncommon prices in many parts of the county for a kiln: between Wanborough and Farnham, I observed a notice of lime to be sold for eight guineas the kiln, or 4½*d.* per bushel: the common price per bushel is 6*d.*—in some places, more.

In the neighbourhood of Chobham, turf is very generally used in the lime-kilns: two guineas worth of turf are necessary for a kiln of the ordinary size*.

Coal is no where used for this purpose, both as being more expensive than faggots or turf, and as leaving part of its ashes among the lime, and thus rendering it less pure and valuable.

The quantity of lime laid on per acre, varies with the soil: a kiln of about 400 bushels will lime three acres well, where the soil is moderately strong, as in the south-east corner of the county: in the Weald, from 150 to 200 bushels per acre are found necessary: on the sandy loams, only 80 or 100 bushels are required. It is applied generally every time the land is in fallow, or every four, five, or six years, according to circumstances. Hence it appears, that the practice of liming slightly and often, is general in Surrey.

It has already been remarked, that lime, as well as other manures, is often suffered to stand in heaps for a long time before it is spread: this is particularly the case in the Weald, where the proper application of it is of much more consequence than in any other part of the county, both as being more peculiarly suitable to

---

* "In the north-east district of Cumberland, where the farmers generally burn their own lime, peat is preferred for this purpose, even though there is coal near at hand. Coal is considered there as requiring more time to burn a kiln, and as being apt to make the limestones run into solid lumps. When coal is used, two or three days must elapse before any lime can be drawn; whereas, with peat, it may be drawn in 12 hours.

"A man and a boy will dig as many peats in one day, as will burn 180 bushels of lime: the expense of digging and drying them does not exceed 5*s.*; coal necessary to burn the same quantity of lime, costs 12*s.* at the pit: so that by the use of peat there is a double saving—in expense and in time."—*Farmer's Magazine, Nov.* 1802, p. 483.

the soil, as being the chief dependence of the farmers there for dressing their fallows, and as being brought from a great distance along very bad roads. Yet nothing is more common than to see the heaps of lime stand so long exposed to the rain and atmosphere, that when it is spread, it is little, if at all better, or more removed from chalk, than it was before it was put upon the kiln. Certainly on such soils as are found in the Weald, the principal, if not the only benefit of lime, must arise from its being ploughed in, in its hot or caustic state.

From the great success resulting from the use of lime on the clays of the Weald, the farmers of the northern clays at the foot of the chalk-hills have been induced to try it, in many cases, in preference to chalk. Some of them, however, complain that they perceive no benefit, nor indeed any effect whatever, from either lime or chalk, when applied to the clays at the foot of the chalk-hills. This most probably arises from the mixture of calcareous substances which, from their vicinity to the hills, are to be found in them: the inaction of lime, if applied in its quick state, can be accounted for upon no other supposition so probable as this: nor is it any objection to it, that no calcareous matter is perceptible, since a considerable proportion may exist, without its affecting the general appearance of the soil. Some surprise has also been expressed, that lime should have less effect on ground lying on or near a chalky subsoil, than on ground lying over a bed of limestone; but from the solid nature of the latter, no mixture with the upper soil can possibly take place; while the loose and friable nature of chalk, easily intermixes it with the upper and adjoining soils.

*Clay.*—The only instance of the application of clay that I met with, was at Oatlands. Mr. Kendal, steward to the Duke of York, found the poor and lifeless soil on the new enclosures there, much benefited by spreading clay, or more properly brick-earth, over it: he had been able to procure but a very small quantity; but its good effect on the crop growing when I saw the field (turnips), was very evident and striking.

*Gypsum.*—The same uncertainty and difference of opinion respecting the effect of gypsum as a manure, prevails in Surrey, as in the other counties where it has been tried. By most of the farmers who have applied it, it is deemed completely inert; nor is it easy to perceive how it can operate, considering the very small quantity that is sown upon an acre. If it were used in as great abundance as chalk, it is not unlikely that its effects would be nearly the same, at least so far as regards the division of the soil; for it could hardly produce any effect by its decomposition, or by its being taken up as food by the plants: may it not, however, as well as the other calcareous substances used as manure, operate on the fibres of the living plant, and thus dispose it to more healthy action, and to take up and assimilate more easily and completely, its natural and peculiar nourishment?

It may justly be questioned, whether any kind of manure which, like gypsum, is so very uncertain in its operation, deserves to be generally recommended or adopted; since from its frequent failure, under circumstances apparently exactly similar to those under which it is said to have been successful, it is highly probable that the good effects attributed to it, proceeded from other causes: this at least is manifest, that its success depends on circumstances entirely beyond the knowledge or the power of the farmer: let him follow ever so implicitly and minutely the directions given for its use, by those with whom it has succeeded, he has as little chance of being benefited by it as if he had applied it at random. If these circumstances respecting it are established (and those who have examined the different reports of the trials made of it, can have little doubt that they are), the adoption of it can never become general, nor is it desirable that it should.

By far the most favourable account of the result of the use of gypsum in Surrey, of any I heard of, is that which is supplied by Mr. Malcolm (vol. ii. p. 66), which it is but fair and proper to quote.

" Mr. William Saunders, of Stonehall-farm, Oxted, has favoured me with the following account:

" Upon sainfoin, he applies five bushels to the acre, which he thinks quite enough; he sows it as regularly as possible, in the month of February, in dry weather. He always mows the first crop for hay, which he finds to yield so abundantly, as to exceed that which has not been gypsumed (all other things being alike) by nearly one load per acre; the second growth he generally feeds with sheep. He is of opinion, that it forces vegetation more than any other manure with which he is acquainted; and he grounds his opinion upon the circumstance, that it wears out this plant in four or five years, instead of seven or eight, which it would otherwise have lasted. When he breaks up the ley that has been gypsumed, he always sows pease, which yield an immense crop.

" When clover is thin upon the ground, he top-dresses it with gypsum, at the rate of five bushels, and sometimes six bushels, per acre, according as the plants may be more or less thin, and he finds that they stock out so much as to cover the ground very abundantly; and that he might be convinced of the value of gypsum as a top-dressing for this plant, he left a certain portion of the land in the middle of a large field, where the soil was of equal quality, not gypsumed, and the result turned out to be nearly one load per acre in favour of gypsum. He has frequently observed the same difference in other fields, and therefore he does not fail to increase the practice. Upon this ley he sows wheat, and the produce is in every point of view, superior to clover that may have been manured with any other dressing.

"Wheat top-dressed with it, will, if rain speedily follows, stock out surprisingly, and by the activeness of its stimulating powers, it will bring it earlier ripe, of a finer quality, and greatly increase the produce. It is an enemy to worms and other terrestrious insects.

"Mr. Kirwan recommends eight bushels to the acre, as a proper quantity for top-dressing, but upon mentioning it to Mr. Saunders, he assured me that he had tried it in various quantities, viz. from five to eight bushels, upon the middling as well as upon the strongest soils upon his farm, and he found that three bushels succeeded well with all his crops, upon all soils but his very light ones; that five bushels were still more productive upon those soils, and that eight bushels uniformly injured the crop: he therefore confines himself within five bushels, but uses three, four, or five, a little more or less, according as he thinks either the land or the crop may stand in need of it."

*Refuse Fish.*—The great quantity and variety of manures supplied by such an immense place as London,

don, and their comparative cheapness, have undoubtedly caused many kinds to be overlooked or undervalued: among these may be reckoned refuse-fish, a deal of which, as well as fish-guts, is thrown into the Thames. That such manure would be highly beneficial on all kinds of soil, and even in small quantities (two very great recommendations) is well known from the unvaried result of all the trials that have been made with it. As far as I could learn, however, it is not used in Surrey: occasionally, or rather accidentally, no doubt it has been laid on the ground: a curious instance of the effect of it, I heard of at Godalming: a farmer in that neighbourhood purchased a quantity of refuse fish in London, which he laid on his barley land: the crop was evidently much benefited by it with respect to quantity; but its effect on the quality of the grain, he probably would never have learnt, had it not been for a person to whom he sold some of it for the purpose of fattening swine: this person was extremely eager to purchase more of it, and assigned as the reason of his eagerness, that his swine, while fed on it, had fattened much more kindly and quickly than on any other barley he had ever tried. As this person was entirely ignorant of the manure that had been used, it could not be mere fancy, or a wish to deceive.

*Ashes.*—In the neighbourhood of London, great quantities of coal-ashes are used; in the Weald, the ashes of wood or furze; and in the western parts of the county, the ashes of turf or peat. They are all principally used as top-dressings for clover or sainfoin; for the latter, coal-ashes are preferred, especially if the soil be cold and close.

Coal-ashes are laid on at the rate of from forty to sixty bushels per acre: the price varies greatly, as they are much used by the brick-makers as well as the farmers.

Rather a less quantity of the ashes of wood, furze, turf, and peat, is applied to the acre; generally between thirty and forty bushels, the usual price 6*d.* per bushel. It is a common practice for the farmers either to furnish the cottagers with wood or turf for fuel, or to cart it home to them, on condition that they let them have all the ashes. The ashes from wood, furze, &c. that have been used to burn lime, are by some preferred to their ashes, when employed as fuel, as containing a portion of calcareous matter.

The principal, if not the only places in the county, where the peat is burnt for its ashes, are at Frimley and Warplesdon: a heap of peat, which usually contains three loads, will burn to about 2000 bushels of ashes: the price per bushel on the ground is 2*d.* It is said, that 70*l.* nett profit has been made from an acre of peat land at Frimley.

*Soot.*—This cannot be obtained in such quantities or so cheap, now as formerly, owing to the increased demand for it by the different manufacturers of sal-ammoniac, &c. It is used as a top-dressing, chiefly for wheat and young clover: its effects are found to be very much influenced by the state of the subsequent weather: if it prove very dry, little benefit, and sometimes rather harm, results from the use of it: in moist weather it is most serviceable.

The price in London is about 1*s.* per bushel: from thirty to forty bushels are sown as a top-dressing for wheat, and about one-third less for clover. A chimney-sweeper is commonly employed in Surrey to sow it, at the rate of one halfpenny per bushel, or 1½d. for two bushels.

*Malt Dust.*—Very little of this is used in Surrey, although a considerable quantity of malt is made in different parts of the county, particularly at Kingston, Wandsworth, Croydon, Guildford, &c.: most of the dust from these places goes into Kent, Berkshire, and Hertfordshire.

Where malt dust is used in Surrey, it is applied as a top-dressing for barley, clover, and wheat: the quantity per acre is from four to six quarters: the price 7*s*. 6*d*. and 8*s*. per quarter.

*Rabbits' Waste.*—This has been used with great effect as manure for hops, potatoes, and on summer-fallow for wheat, in the south-eastern parts of the county, both on strong and light soils, and appears to produce very beneficial effects wherever it has been tried, particularly on the potatoe crop. It is found very difficult to bury them sufficiently so as that the harrows shall not drag them to the surface; and to take them off sufficiently clean from the spot where the heap has been laid: perhaps in order to prevent this, and at the same time to distribute the fertilizing qualities of the manure more equally over the soil, it would be preferable to form a compost of them, and to suffer them to be well reduced and mixed with the earth of the compost before they were laid on.

The price at the furriers in London or the Borough, is 15*s*. or 16*s*. per quarter: from two and a half to three quarters are commonly laid on the acre.

*Ploughing in Green Crops*—Is not now much in use in Surrey: to feed them off on the ground is found to benefit the succeeding crop much more, and to be much less troublesome and expensive. In some parts of the county, however, tares, and occasionally buck-wheat and rape are ploughed in; and I met with one instance in the neighbourhood of Guildford, where a very strong and luxuriant crop of charlock was ploughing in on a thin light soil upon chalk, for wheat.

When tares are meant to be ploughed in, they are sown at the rate of three or four bushels per acre, as early in the spring as possible; and when they are in full blossom, they are cut down with the scythe or sickle, and ploughed in with a wide furrow: nearly the same method is pursued with the buck-wheat: the rape, of course, is ploughed in as it stands.

In the instance of the charlock already alluded to, the roller was employed to press them flat: the wheat was then sown upon them, and both were ploughed in together. I could not learn positively whether the charlock had been sown for that purpose, or whether, having choaked a field of turnips, it had been thus turned to advantage.

*Town Dung.*—From London are procured immense quantities of stable-yard dung, night-soil, and the sweepings of the streets; the first is often carried to the distance of eighteen or twenty miles, and sometimes further, where it is merely an article of back-carriage: all of them are conveyed up the Thames to the north-western parts of the county.

The stable-yard manure procured in London, is in general nothing but long dry straw, which must require a considerable time and a good deal of management before it is fit to lay upon the ground. The price is 3*s*. or 3*s*. 6*d*. for a cart load of perhaps two and a half cubical yards, which, however, from the state it is in, will probably not weigh 24 cwt. or 7*s*. per waggon load.

As the management and application of stable-yard dung is in every point similar to those of long and fresh yard-dung, they will fall more properly to be considered hereafter.

Night-soil, though so evidently a powerful manure, and fitted for almost every soil and crop, does not appear to have been much in demand among the farmers of Surrey till very lately: the grand depository for it is St. George's-fields, from whence it is brought by the farmers' carts. It is applied either by itself or mixed with mould and lime, principally for wheat, and is found, as might be expected, to benefit the crops greatly: it is also sometimes used for turnips: indeed, as has already been observed, this manure *must* be beneficial to every crop: the only danger is, that the crops of corn should lodge by too great a quantity of it being applied.

From three to five waggon loads are considered amply sufficient for any crop, even upon thin and poor soils: as, however, it must necessarily be extremely difficult to spread it evenly over the surface, perhaps the best mode of using it is by mixing it with mould: indeed, such strong and concentrated manure is evidently by far the best adapted, if not absolutely necessary, to be mixed: the price in St. George's-fields is 7*s*. per waggon load.

The sweepings of the streets, composed of an infinite variety of rubbish, some useful, some of no effect, and some perhaps rather prejudicial to the land, are used principally by the farming gardeners in the neighbourhood of London, and in the physic gardens at Mitcham, &c.; very little of it going to any great distance from London, or being used by the farmers. The price of this manure in St. George's-fields, is from 3*s*. to 3*s*. 6*d*. the cart load; and from 1*s*. to 2*s*. more, if carried up the Thames to Kingston, Weybridge, Chertsey, &c.

Besides what is swept off the streets of London by the scavengers, there is a deal of different sorts of rags, &c. thrown out of the shops of the sadler, tailor, &c. consisting of pieces of leather, and of woollen and linen rags, which are gathered by women: these are used by the farmers near Guildford, chiefly on their light lands: they are chopped into small pieces and sown on the clover-ley for wheat: 8cwt. per acre is the usual allowance: in some seasons they answer well, but their effect is soon exhausted. The price is 6*l*. 10*s*. per ton, brought up in barges: 9*d*. or 10*d*. per cwt. is paid for chopping them, so that the expense per acre, exclusive of sowing them, is about 58*s*. As the chopping of them is troublesome, expensive, and tedious, when done on a small scale by the farmers' labourers, it would seem preferable that the rags should be cut into small pieces by those who sell them: by regularly employing people to chop them on a large scale, it would be done better and cheaper, and probably some machine might be invented that would save much time and labour.

*Yard Dung*.—This can hardly be said to be the chief dependence of the farmers in Surrey, except of those who are too far distant from London to bring stable and other manure from thence. In making it, some farmers consider it the most advisable method to employ their straw merely as litter for their sheep, cattle, or horses, to which plenty of green food or hay is given: there is by this method, no doubt a greater quantity of manure made from the same quantity of straw, than there would be if the straw had been consumed by the cattle: and when the advantage to the cattle is taken into the account, it is probably the most profitable method, upon the whole, to such farmers as are not very near to the London Hay-market. By this means, however, a greater proportion of long manure must be made, unless very great care and attention are bestowed on mixing the litter with the dung. In Surrey, the general opinion appears to be decidedly in favour of rotten dung; and in order to get it into this state, the long town and yard dung is either frequently turned, or is formed into a compost: the mode of making and managing the latter, will fall to be considered afterwards. The faults of the Surrey farmers in the management of their dung-hills, are those of most other counties: they are unnecessarily prest down by the carts while they are making; and in turning them over, the long dung is not sufficiently broken or torn to pieces, and mixed with such as is more rotten.

In the Weald, the heaps of dung are often suffered to stand a long time on the fallows before they are spread: this has already been noticed as too general a fault in Surrey; but in this part of the county, such delay is not only prejudicial, as permitting the dung to be spent, but is extremely hazardous on soils which, from their flat surface and retentive bottom, frequently render it impossible for the most active and regular farmer to get his wheat sown.

Although the Surrey farmers are for the most part decidedly of opinion, that dung should not be laid on in its long strawey state, yet they are by no means agreed to what degree it ought to be allowed, or to be made to rot before it is in a fit condition to be used: this question, so far as regards the proportional quantity of fertilizing matter contained in dung of different degrees of rottenness, and the facility with which it is given out, will probably, like many other disputed points in agriculture, not be soon decided, from the great variety of permanent and accidental circumstances, many of them overlooked and unnoted by the most accurate experimentalist, which are continually assisting or defeating the operations of the manure; but there can be no doubt, that dung well rotten may be mixed more equally and intimately with the soil, than dung in a half rotten state.

Besides the fault of not spreading the dung sufficiently soon, there is another too commmon in Surrey, viz. that of not breaking down the lumps of close compacted rotten dung before it is spread: the consequences are, that it is not spread evenly, and that the plough merely pushes the greater part before it instead of burying it; for the former there is no remedy: in order to prevent the latter, a plough with a skim fixed on the coulter, higher up than when the turf of clover-ley is to be cut off, is used: this turns the lumps of dung into the preceding furrow, where they are of course buried by the following one. As this, however, remedies only one part of the evil resulting from the spreader not breaking down the dung, and renders him less careful, it would perhaps be better to be more strict towards him, and thus endeavour to prevent that, which can only be partially remedied.

In the Weald, farm-yard dung is universally applied to the summer-fallow for wheat: in the other parts of the county, it is used for turnips, wheat after clover-ley, and sometimes for winter tares, where they are meant as a preparation for wheat. Where it is laid on only once during a rotation of four crops, ten, twelve, or fourteen loads of two cubical yards are given to the acre: but the more preferable mode on turnip lands is, to divide the quantity, and apply it twice, to the turnips, and on the clover-ley for wheat.

Beside the different kinds of manures, of which an account has been given, there are several others procured from London which are only partially used; the proper application, and the peculiar virtues of which, are not so well understood in this county, such as horn-shavings, sugar-bakers' refuse, bones, &c. Indeed, the farmers of Surrey cannot justly be charged with neglecting the advantages they enjoy in the important article of manures from their vicinity to London, except in the single instance of refuse-fish and whale blubber; great quantities of which might certainly be obtained at as low a price as many other kinds of manure less valuable and less generally applicable.

*Composts.*—In the management of their composts, the Surrey farmers are very careful and skilful, as well as economical in the materials of which they compose them. The scrapings of the roads, the scourings of the ditches or ponds, the superabundant mould of the head-lands, are carefully collected and mixed up, either with the rich manure from London, with the farm-yard manure, or with chalk, and often with them all. These are frequently turned, though like the dung-hills, they are not so completely and intimately mixed during the turning, as they might and ought invariably to be. Another fault appears in the management of them: large pieces of the dung or fertilizing part of the compost are often seen lying uncovered on the top, exposed to the heat of the sun, or to be washed by the rain: whereas, if the top had been completely covered over with the mould, not only no waste of the dung would have taken place, but the whole of the compost would have been made equally rich, and consequently every part of the field on which it was laid, would have been equally benefited.

A mistaken idea prevails in many parts of Surrey, that any given quantity of a compost is as rich as the same quantity of the dung which forms a part of it: this notion, strictly speaking, is no doubt erroneous, though it may be questioned, whether, if a compost is well made, so as that the dung gives out its fertilizing properties equally to the mould, a given proportion of it will not be as useful as the same proportion of unmixed dung, in the state and manner in which it is usually spread on land.

Composts are used for turnips, clover, wheat, tares, and pasture: they are found particularly applicable and beneficial as a top-dressing, both from the minute division of the manure they contain, and also from the earth in them, which gives warmth and vigour to the young and tender plants.

## SECT. IV.—IRRIGATION.

The very small quantity of meadow land in the county, and the situation of much of it, prevent irrigation from being commonly practised: at the same time it must be allowed, that there are some favourable spots where it might be carried on with ease and advantage, entirely neglected; and that in many places where it is practised, it is done in a very slovenly and inadequate manner[*].

In the south-eastern corner of the county, in the parishes of Godstone, Oxted, Tanridge, Lingfield, and Crowhurst, irrigation appears formerly to have prevailed more, and to have had more attention paid to it than at present. At Cobham, Byfleet, Clandon, and a few other places in the western parts of the county, a few acres may here and there be seen irrigated on the banks of the Mole and the Wye.

Mr. Birkbeck has taken advantage of a warm spring which rises near his house, to water some meadow land; and he finds it to be of great advantage in bringing the grass early forward: that this is produced by the heat of the water, and not by any thing which it contains, appears from the effect growing weaker the greater the distance from the spring, and at last ceasing altogether.

---

[*] The following passage from Aubrey's History of Surrey (1673), proves that irrigation has been long known in Surrey.

"Sir Richard Weston conveyed the water from Stoke river juxta Guildford, to his manour of Sutton, whereby he floated six score acres of ground, which before was most of it dry."—(iii. 229).

In p. 231 of the same volume, he remarks, "The Lord of this manor (Send) hath a large number of acres of heathy, barren, fearney ground, which lies above the river Wye seven or eight feet: whereas the land on the other side of the river, which is overflowed by it, is as rich meadow as any in this country. I cannot help taking notice of an estate at Dunclin, in Worcestershire, purchased by Mr. Foley, about 300 per ann. which was sandy ground covered with heath, and improved to above 600 per ann. by letting the waters into them."

Thus we see that we may reckon Surrey as one of the counties of England into which clover, sainfoin, trefoil, irrigation, and probably turnips, were first introduced.

The opinion among the Surrey farmers of the utility of irrigation, is not so high nor so general as it is in many other places: this, however, probably arises from their want of experience in the choice of the proper season, and in the management of the water: their objection is, that it injures the quality of the grass to as great an amount as it benefits the farmer by a heavier and earlier crop. Certainly if water of the proper quality, such as that of the Mole, which brings a deal of chalk down with it, were used, the proper season chosen, and the proper soils, this consequence would not result. I saw a small field near Ewel, over which a chalky stream was sent, both in the spring and in dry weather, and the grass was not only more abundant, but the cattle were extremely fond of it. When the field happened to be partially irrigated, the difference of the pasture, both with respect to quantity and to the healthy and fresh appearance of the grass, was striking. The watering this field was found particularly serviceable in a dry summer.

It has already been noticed, that irrigation can never prevail much in Surrey; besides the want of situation, and the small quantity of meadow land, the waters of one of its rivers, the Wye, are not favourable to this practice; as one of its principal branches brings down from the hills near Godalming, immense quantities of sand, which rather injures than benefits the meadows over which it is flooded. The Mole, and that branch of the Medway which rises near Oxted, bring down the most fertilizing waters for the purpose of irrigation: but the number of mills on the former, and the uneven ground through which it runs, during a part of its course, and the very confined corner of Surrey through which the branch of the Medway flows, necessarily confine their application for watering very much.

# CHAP. XIII.

## LIVE STOCK.

### SECT. I.—CATTLE.

FROM the account which has already been given of the application of the ground in Surrey, it will be evident that of the live stock to which attention is here paid, cattle form a very inconsiderable part. Indeed, if we except the cows that are kept around the metropolis, for the purpose of supplying it with milk; and those that are kept in the more remote parts of the county, for the purpose of suckling calves for the London market, cattle seldom form a standing, regular, or considerable part of a farmer's stock. We shall therefore first notice such as are kept for milk to be sold in London, and such as are kept for the purpose of suckling calves, and then give a short account of the few that are kept for the butcher.

On the subject of cows that are kept for supplying the metropolis with milk, Mr. Middleton, in his Survey of Middlesex, has treated so amply, and with such abundant sources of information, that it is impossible to add to what he has said, and difficult to advance any thing which will not appear to be taken from his work.

From the statement of Mr. Foot, given by Mr. Middleton, it appears, that of 8500 cows kept for the sup-

ply

to carry it on to a great extent; but from various causes, this practice is on the decline; or at least, is now not carried on to a very great extent, or with much spirit, any where, except in the more retired and distant parts of the county, about Chobham and Bagshot, and in some parts of the Weald.

A good cow, it is calculated, will suckle two calves, and yield milk sufficient to bring up a third half way. The average value of the calves, when they are fit for the butcher, at about 12 weeks old, may be between 4*l.* and 5*l.*: if this statement is correct, a sufficient cause will be shewn, why the rearing of calves is not so common as it was. A cow, by being employed in this way, will not bring more than 10*l.* or 11*l.*; and when the first price of the cow—the per centage to be allowed for accidents to which she is liable, and to replace her when she dies—and the expense of her food, and of the attendance necessary in rearing the calves—are taken into account, this practice will not appear very profitable.

As each cow brings up more calves than one, it is evident that there must be a great demand for calves: this has given rise to calve-merchants, who attend the different fairs, and purchase calves for the Surrey farmers: the fair at Aylesbury, in Buckinghamshire, is particularly resorted to, as the calves bought there are considered as fattening more kindly, and producing more marketable veal, than the calves from most other places.

The principal circumstances to which it is necessary to pay particular attention in the rearing of calves, are, that they be kept perfectly dry and clean; that they be suckled *regularly* twice in the twenty-four hours; and that the acidity of stomach, natural and very dangerous to all young animals, should be carefully prevented, or speedily removed: this is done by supplying them with chalk. Some persons are yet in the practice of blooding them frequently. Calves that are intended to be brought up to maturity, are often fed on the second crop of clover, cut small, and mixed with oil-cake: this is found to be very acceptable and nutritious to them.

Most of the cattle that are fattened for the butcher in this county, are in the hands of the great distillers at Battersea, Vauxhall, &c. The following account of the buildings, &c. of Messrs. Hodgson and Co., at Battersea, for the purpose of fattening cattle, is given by Mr. Malcolm, in the Quarto Report.

"Nearly adjoining to their horizontal mill, they have erected a very large and extensive distillery; and almost circumscribing their premises, a range of houses have been built, of about 600 feet in length by 32 in width, for the oxen: these houses aae divided longitudinally into separate stalls for each beast, by a rail or bar placed between them, three feet six inches asunder. The oxen are placed in two rows, standing with their heads opposite to each other; and in the middle between the two rows, is a passage six feet wide, the whole length, and one at each end, of the same width, where the cattle go in and out: latterly they have introduced an open wooden trellis, or grating, made strong, which is placed on blocks five or six inches thick, raising the grating above the pavement. The intention of this trellis is, to keep the animals from the pavement, that they may not only lie dry, but also that they may with greater facility be kept clean, which as often as they want to do, the soil is drawn out from under the grating by means of a broad hoe;

and likewise that their feet, naturally tender, may be kept from being bruised by the hardness of the pavement; for whenever that happens, they do not thrive*. For every 100 of oxen, two men are kept, whose business it is to feed and to clean them. The allowance is one bushel of grains, put into a triangular trough filled with wash, to each; and one truss of hay *per diem* to every 15; to which is added sometimes, some of the meal-dust that flies from the malt in grinding. Their time of buying them in is about September, at which period they are generally bought at Kingston and other west-country fairs: the number which they there buy is from 400 to 500."

They purchase all kinds, but especially the Welsh and Hereford, with some few of the Scotch and Yorkshire: the Sussex and Devon they are not partial to. It is reckoned, that each head of cattle will pay from 10*s*. to 15*s*. per week; some more, some less, according to the condition in which they are bought, and the quality of the breed or particular beast: they generally require between three and four months to fatten.

The practice of currying cattle regularly is adopted by many of the feeders, particularly at the distillery in Vauxhall, and is found to answer remarkably well. The Galloway cattle are mostly fed here.

Many of the gentlemen and farmers in Surrey occasionally fatten a few oxen; but none of them carry it on with more regularity, nor to a greater extent, than Mr. Adam, of Mount Nod, and Mr. Coles, of Norbury. The buildings of the former, which are constructed with great regard to convenience, are sufficient to contain 600 head of cattle: they are regularly fed with one pound of linseed, one bushel of grains, and one bushel of chaff, all mixed together; and one truss of hay between eight or ten. Mr. Coles feeds his cattle with oil-cakes and hay, which indeed is the food principally given. Some farmers let their cattle have the run of the farm-yard, well littered, where, by giving them oil-cake, a great deal of manure is made: others feed them tied up in stalls; this is certainly the preferable practice in every point of view. A farther improvement would be, to substitute turnips, in part at least, for oil-cake: the expense would be much less; the quantity of manure would be as great, and the quality little inferior; and the flavour and firmness of the flesh would certainly be improved. The value of turnips, except as food for sheep, seems not well understood in Surrey.

---

* Since the Quarto Report was drawn up, the trellis has been removed, as the unevenness of the surface was found to injure their feet; and the stalls are now paved with bricks.

Lean cattle are bought in the autumn by some farmers, especially in the Weald, and kept as *winterers* in the straw-yard, without any oil-cake being given them. In such a soil as that of the Weald, where turnips cannot possibly be grown with advantage, and in which the first and principal step towards improvement must be a command of manure, the plan so successfully pursued in East Lothian by Mr. Brown, of Markle, and so well described by him in the Farmer's Magazine, seems well worthy of adoption*. He fed 24 head of cattle on clover and tares, cut and brought into the farm-yard; and the result—whether the saving of food, the making of manure, or the good condition of the cattle, be regarded—fully equalled his expectations.

---

* Farmer's Magazine, vol. vi. p. 460—4 (Nov. 1805).

tions. It is evident, if this plan were regularly pursued on clay soils, the necessity of frequent summer-fallow would be done away with, and the condition of the ground much improved by the additional quantity of manure. Under such a system, many of the advantages of the turnip husbandry on light dry soils, would be procured on wet clayey ground.

It appears that oxen were worked in Surrey by many farmers some years ago; but now only a very few are used in harness. The question respecting the comparative advantages of oxen and horses for the purposes of husbandry, has been much agitated: perhaps none of the trials have been perfectly fair, or of sufficient duration to decide the question; but the fact of oxen being given up in most places where they were formerly used, joined to the consideration of the comparative make, strength, and agility of the horse and ox, go far to convince us, that the latter can never be used to so great advantage as the former*.

---

* Before quitting this subject, it may be proper to notice the account Mr. Marshall gives of the cattle on the heaths of Surrey. "Those," says he, "which are most conspicuous on the barren flat heaths of Surrey, are small mean-looking cattle: yet they must be of a quality intrinsically good, or they could not exist on so bare a pasture. Their bone is in general remarkably fine. In horn, colour, and thinness of carcass, many of them resemble so much the ordinary long-horned breed, that there can be little doubt of their being of one and the same race: and what is observable, here the long-horned breed terminate to the south."—(*Marshall*, ii. p. 85.)

SECT.

### SECT. II.—SHEEP.

SHEEP are kept in considerable numbers in the middle part of Surrey; upon the chalk-hills; on the sandy loams that lie immediately between the chalk and the Weald, and those that occupy the south-west and west parts of the county, between Godalming and Farnham; on the heaths between Farnham and Bagshot; on the mixed loams that unite the sandy ridge which runs from Godstone to Dorking, with the clay of the Vale; and on the sandy loams intermixed with clay, which lie to the north of the chalk-hills. Such farmers as possess land lying on or near the chalk-hills, are peculiarly well situated for keeping large flocks of sheep: on the Downs, the pasture is remarkably good, and well suited to this animal; and there is no difficulty of finding, among the arable land of this part of the county, soils proper for turnip. In the more immediate vicinity of London, and in the Weald, very few sheep are kept: near London, the land is occupied to greater advantage under a different system; and the soil of the Weald, joined to its low and damp situation, renders it unfit for sheep.

1. *Breed.*—It is only comparatively of late, that much attention has been paid to the peculiar breed of sheep in this county: the large Wiltshire, in the memory of many still living, occupied entirely the sheep-farms on the chalk-hills, where folding or fattening for the butcher were the sole objects; while the singular breed of small ill-formed sheep then entirely occupied the extensive heaths in the west of the county, which

they still (though not in so pure a state as formerly) continue to occupy. But there is reason to believe that, before the introduction of the Wiltshire sheep, a small breed, affording remarkably sweet mutton, were generally kept on the hills: for Mr. Evelyn, in his letter to Mr. Aubrey, prefixed to the latter's History of Surrey, which was written about 25 years before the end of the seventeenth century, rather complains that the introduction of paring and burning had, by destroying the fine pasture of the Downs, deprived them of their small and sweet mutton.

At present, besides the Wiltshire and Bagshot sheep, the Dorsetshire, South Down, Somerset, or Mendip, the Berkshire, the Romney, and the Merino-South Down, are kept. The South Down, Wiltshire, and Dorsetshire, are by far the most common: the last are kept for early lambs; the Wiltshire are by some preferred for the fold; and the South Down for the butcher, and for their wool.

A cross of the Merino and South Down, and of the Ryland-Merino and South Down, is kept by many of the gentlemen, and by some of the farmers, in Surrey; and from the success which has attended the trials, especially of the latter cross, there is reason to believe that they will gradually supplant the pure South Down, wherever the soil and situation are adapted for them. By far the most extensive and successful breeder of the Ryland-Merino South Down, is Mr. Birkbeck, of Wanborough, near Guildford: his flock is not exceeded, in point of size, by any in the kingdom; and I am sure it would be difficult to find a farmer, better qualified by attention, acuteness, and skill, to carry this breed to the highest degree of perfection. He shore in 1807, 1800 mixed Merino sheep; and obtained, in

1806, Lord Somerville's prize at Barbican. It is pleasant to think that his experiments, which at first subjected him to the imputation of rashness, have already succeeded beyond his expectations, and are likely to overcome the objections and prejudices that still exist against the mixed breed. There can be little doubt, that if his present flock of the first and second cross, amounting to about 1500, be regarded with respect to wool and carcass jointly, they are superior to any English short-woolled sheep, under similar circumstances of keep and exposure; for it is but justice to Mr. Birkbeck to remark, that neither the soil nor the situation of his farm are extremely well calculated for keeping sheep that are in the least tender. The following observations, with which I have been favoured by Mr. Birkbeck, discover so much good sense, and such sound principles in the art of breeding, that I shall lay them before the reader in his own words.

" In breeding from varieties possessing, on one side, a valuable fleece with a defective form; and on the other, a good form with an inferior fleece, the result will be a flock, comprising individuals which partake of the character of each parent in various degrees of combination: generally, the produce may derive pretty equally from both; but in some, the bad shape of the one may be seen united to the bad fleece of the other; and a few favoured individuals will exhibit a large share of the good qualities only, of each parent stock: on the judicious selection of these depends, in great measure, the success of the undertaking. And from what has already been effected, I see no reason to doubt our possessing, in a few years, the English shape and constitution, covered by a fleece at least equal to the native Spanish. How soon we may arrive at this desirable point, and at what cost, remains to be proved. The latter and more important question regarding the cost, has, in my experiment, received a most satisfactory solution, by the addition of about 400*l.* to my own receipts in the article of wool; whilst the intrinsic value of my flock, taking wool and carcass jointly, is absolutely increased. In confirmation of which, I might instance the five ewe hogs which were honoured with the first prize at Lord Somerville's Show, in March last. My competitors on that occasion were South Downs from various parts of the kingdom, such as I should not have presumed to rival with my original stock; and the judges were certainly not prejudiced in favour of Merino-Down sheep. As to fleece, that of the first cross is to South Down as 10*s.* 3*d.* to 5*s.* 3*d.*; the former averaging about 3¾ lb., at 2*s.* 9*d.* per lb.; the latter 3lb., at 1*s.* 9*d.*—an improvement which has not its parallel even in the 'Annals of Agriculture.'"

As there cannot be the least doubt of the improvement of the wool by the cross of the Merino breed, the point that now deserves particular attention is, to remove the bad shape of the Spanish sheep; and this certainly may be done, by carefully following the rule Mr. Birkbeck has laid down, of selecting such as are most favoured in carcass and wool: he shewed me some lambs of the second cross, in which it was difficult to perceive any of the ugliness of the Spanish breed; and if these were selected, there is every reason to believe that a form, nearly as good as that of the South Down, if not quite equal to it, might be got. As there is now no other objection to the mixed Merino but the shape (the unfounded opinion respecting their being too delicate, or not suited for this climate, being done away), the great object of such as possess a flock of this breed, ought to be the removal of this objection by careful and repeated experiments. Mr. Birkbeck has put this year a Merino ram to some Leicester ewes; the result will probably be a matter rather of curiosity than importance. Mr. Drewitt, of Send, is carrying on an experiment with four sheep, each of a different kind, in order to ascertain the comparative advantage with respect to keep, fattening, &c.: they are, a Merino South Down, a Ryland-Merino South Down, a pure South Down, and a Leicester. Lord King tried a cross of the South Down and Ryland, but the result did not discover any improvement.

The South Down sheep in Surrey are not often quite pure: they are generally a little inclining to the Berkshire. The Bagshot sheep also are scarcely ever now found unmixed, the South Down beginning to occupy (either pure, or crossed with the native sheep) even the remote heaths of Surrey. A pure heath sheep is a very ugly creature, with very large horns: it seldom weighs more than 8 lb. per quarter.

In some parts of the Weald, where a few sheep are kept, the breed appears to be a mixture of the Welsh and the South Down, or of the Welsh and the heath sheep. Few Leicester sheep are to be seen in Surrey, and the Romney are confined to one or two farmers in the south-east corner of the county.

2. *Food.*—The principal dependence of the farmers for the food of their sheep, is on turnips, rape, rye, tares, and trefoil: some put them on the sainfoin in the spring and autumn; but others object to this practice, as very prejudicial, and often fatal, to that valuable plant.

By sowing the common turnips at different times, and by having also a portion of the Swedish turnip, and of rape, rye, and winter tares, the Surrey farmers are enabled to keep their sheep till the spring is pretty far advanced. If the turnips should fail, or the weather during the winter prove so severe, as to oblige them to bring their sheep into the farm-yard, hay, corn, and oil-cake are then given them, according as the purpose is either merely to keep or to fatten them. It is extremely difficult to get sheep to eat a sufficient quantity of dry hay; this, however, Mr. Birkbeck effected, by cutting the hay fine, and giving the sheep, along with it, plenty of pure water: by this method he got them to eat about 3½ lb. a-piece each day. It is a very common practice with the sheep farmers, to sow trefoil on the land which is to come in for fallow the next year; this, growing rapidly, serves as excellent food for the sheep after harvest: on this, or on the stubbles, where there are no downs attached to the farm, the sheep are kept till the turnips are ready; they are also put upon the clover, where it is not intended to cut it a second time, or to keep it for seed. Where downs are attached to a farm, a great advantage is derived, as the pasture they afford is not only remarkably fine, but it is seldom much injured by the heats of summer.

3. *Folding.*—It has already been remarked, that the Wiltshire are generally used for folding. As the hill-farmers depend principally on folding for manuring their summer-fallow, it is a great object with them to keep large flocks for that purpose, even independently of the profit arising from fattening them.

Three or four sheep are usually allotted to a square hurdle; and as there are 1030 square hurdles to an acre, the number of sheep sufficient to cover an acre, will amount to about 3500. It is calculated that a flock of 500 will manure an acre in about a week. On the hills of Surrey, the hurdles run from seven to nine feet in length; but they are staked at the average distance of seven feet and a half: allowing three sheep to a hurdle, each sheep will have a space of 18 or 19 square feet: if the sheep are full grown Wiltshire, they are allowed 22 square feet.

With respect to the loss or benefit of folding, there is much difference of opinion; and where experiments are wanting, mere argument only tends to confuse the subject. So far as respects the land held by the farmer, there can be little doubt that the manure given to one part of it, as it is taken from another part, is no absolute gain; but where the sheep are fed on downs of such a close and durable pasture, as not to be materially injured by driving the sheep fed upon them to fold on the arable land, there may not be so much objection to the practice. It would be difficult to determine by experiment, whether one part of the farm did not lose as much as the other gained by this practice; but it would be comparatively easy, and of great importance, to ascertain the effects produced by it on the sheep, in point of health, quality of wool, and quickness of fattening.

4. *Management.*—There is nothing peculiar in this respect. Most farmers purchase their lambs at six or nine months old: some breed them. The South Down are bought at Lewes fair; the Wiltshire at Weyhill: both about Michaelmas. The former are usually fatted at two years old: the latter are folded during two summers, and then fatted the following spring.

The more attentive farmers carefully separate their flocks, especially if they be large, according to their age, &c. and thus ensure their feeding better, and fattening more regularly, certainly, and quickly. A shepherd is commonly allotted to each flock of 300 or 400; sometimes, but not often, he has 500 under his care. The shepherd's dog, on the Surrey hills, is remarkably sagacious and attentive.

5. *Distempers.*—The foot-rot prevails more or less, wherever sheep are kept in the Weald, and on the meadows near the confluence of the Wey with the Thames: the meadows on the borders of the Mole are not liable to give this disease. The sheep on the hills are remarkably free from this, and most other distempers. The *yolk*, however, of their fleece is apt to be dried up.

It is not easy to ascertain the average number kept on a given quantity of land; but from the inquiries I made, I have reason to believe that the hill-farmers who have some down land, and such farmers as can grow a sufficient number of turnips, generally keep about one sheep to the acre, or four to five acres.

*Lambs.*—A few years since, Surrey was much celebrated for the number and excellence of the house-lambs, which were sent from different parts of it to the London market; but latterly, not nearly so many are reared, and the practice will probably remove gradually, first to the more remote parts of the county, and ultimately to counties more distant from the metropolis. There are, however, still some farmers who rear a considerable number of house-lambs, about Ewel, Esher, Walton, &c.; though from the increase in the price of labour, and in the first cost of the ewes, the profits are not nearly so great as they were formerly.

Dorsetshire ewes are the only ones employed for the purpose of rearing house-lambs. They are bought at the Michaelmas Weyhill fair, to which they come, full of lamb, from Devonshire and the adjoining counties. The earliest begin to lamb in October, and they continue lambing during the winter. The price of the ewes depends a good deal on the time at which they will lamb, running from two guineas to 3*l.* and upwards.

The ewes are divided into *mothers* and *dam ewes:* the latter are such as have lost their lambs, or whose lambs have been sold. The *mothers* are suffered to remain in the lamb-house with the lambs all night; they are also brought in to the lambs for an hour in the middle of the day. The *dams* are brought to give suck twice a-day, in the morning and afternoon. It is generally found necessary to put the *dams* into a yoke, while suckling the strange lambs.

The ewes are fed well, while giving suck, upon grains, chaff, turnips, hay, oil-cake, bran, &c. Chalk mixed up with a few oats, or a little wheat, is given to the lambs, principally to prevent or remove the acidity of stomach to which they are liable. The lambs are very subject to sore mouths, which arises from the difficulty of cutting their teeth: it has been suggested that the most proper, and probably an effectual remedy for this disorder (of which many of them die), would be to lance their gums, and thus to enable them to cut their teeth without pain or trouble.

The lamb-house is so constructed, as to keep the lambs separate in distinct pens, according to their age. It is kept very warm, and ought to be well littered frequently with clean dry straw.

The price of the lambs varies greatly. According to the season of the year when they are ready for the butcher, they will bring from 25*s*. to as high as 5*l*.

*Grass-Lambs* are also brought up in considerable numbers about Guildford, Ewel, and in some other parts of the county. Such ewes are bought as will drop their lambs in January. The ewes and lambs are fed on turnips, oil-cake, &c. Great care must be taken not to suffer the lambs to touch the turnips or clover when the frost is on them, as that would inevitably kill them. Mr. Charles Hall, of Ewel, had some grass-lambs on turnips this year, and he had contrived a very ingenious and effectual method to protect them and the ewes from the severity of the weather, which might be adopted on a larger scale, whenever sheep are put to turnips in the winter time. He fenced a part of the turnip-field off with hurdles, so completely *wattled* with straw, that neither the rain, snow, nor wind could penetrate: from the top of the hurdles, on that side of the fence where the wind was most likely to come, he had formed a sloping roof of straw, under which the ewes and lambs might be protected from the weather.

Grass-lambs, of course, do not bring so much at market as house-lambs; but then the trouble and expense attending the rearing of them is not nearly so great. They are ready for the butcher in April and May: the ewes are generally fattened and sold in the succeeding autumn.

## SECT. III.—HORSES.

THERE is little or nothing peculiar or remarkable on this subject. Large, heavy, black horses are usually employed by the farmer. Their winter keep is two bushels of oats per week, and straw (usually cut), each horse: their spring food, tares, and two bushels of oats. Hay is given them after harvest, and during seed-time: they are turned out after the clover is cut. Chaff is generally given, mixed with their corn. The black oats are by many preferred for the purpose of feeding horses *.

On the light and sandy loams, where, from the most approved rotation of turnips, barley, clover, wheat, being followed, the ground requires and gets but few ploughings, four horses are reckoned sufficient for 100 acres; but on strong soils, or where a different rotation, requiring a greater number of ploughings, is followed, a greater number of horses is required. On light land, four horses in a plough will plough from one acre and a quarter to one acre and a half in a day, or eight hours, from seven in the morning till three in the afternoon; but the furrow-slice is generally broad. The step of the horses in the plough is very slow and heavy. A lighter and quicker breed would certainly be an improvement.

The keep of horses has greatly risen in expense within these few years: this proceeds partly from the actual

---

* Mr. Pennington, of Lee Place, near Godstone, keeps his horses almost constantly in the open air in the farm-yard, seldom putting them into stable.

increase in the price of food, harness, &c.; and in some degree from the greater pride which the farmer takes, in seeing his horses in good condition. The Surrey farmers reckon, that when every thing is taken into the account, each farm-horse stands them in nearly 50*l.* per annum.

### SECT. IV.—HOGS.

IMMENSE numbers of these were formerly fed at the distilleries at Wandsworth, Battersea, Vauxhall, &c.; but latterly it has been found more profitable to fatten oxen, though there are still great supplies sent, both from the distilleries at these places, and from the starch manufactories in this county, to the Victualling Office.

They come from different parts of England, but principally from Berkshire, Shropshire, and the East Riding of Yorkshire: the Berkshire breed seems generally preferred. They are commonly bought in at the age of 15 or 16 months, and kept from 18 to 24 weeks. It is remarked, that such as are got from Norfolk and Suffolk are the soonest fattened; but their shape is not valuable to make bacon: the Yorkshire are, on the whole, of the handsomest make; and the real Essex, of the least value.

In the distilleries, they are fed at first almost entirely on wash and grains; afterwards, a certain proportion of meal-dust is given them. In the starch manufactories, as the food is not nearly so good, they are obliged to give them pease and beans.

Hogs are kept, in greater or less numbers, by most of the farmers, chiefly of the Berkshire and China breed. There is nothing particular in the management of them *. It certainly would be a great improvement, if the place in which they are fed were distinct from that in which they slept, and usually lay. Rudgwick, on the borders of Surrey and Sussex, is remarkable for a breed of swine that fatten to an enormous size: they have been killed there that weighed 116 stone; 80 and 90 stone is no uncommon weight.

## SECT. V.—POULTRY.

On the commons in this county, especially in the Weald, great numbers of geese are kept.

Of fowls, the Dorking breed is well known: they are large, handsome, and perfectly white; distinguished by having five claws to each foot: they are now not uncommon in gentlemen's poultry-yards in different parts of the kingdom.

It is deemed so necessary to put up a fowl to fatten

---

* Mr. Marshall, however, mentions two particulars of practice in the fattening of swine on the Surrey hills, worthy notice. "In one of them, salt was mixed with their food, in the proportion of a pint to every two bushels of barley-meal, under an opinion that it kept them from disorders, forwarded their fatting, and added to the delicacy and flavour of the pork.

"In the other, the meal or flour, whether of barley, pease, or other grain, was given to them *dry;* and this is the practice of one of the largest and best farmers on these hills, under a conviction, resulting from experience, that the practice is less wasteful than the ordinary one, of mixing water with the flour, and forming them into grout, which in winter is liable to be frozen, and in summer, to be baked to the sides of the troughs."—(*Marshall,* ii. 416.)

before it is killed, that a *barn-door fowl*, or one taken directly from the barn-door, so common in the northern counties, is seldom met with here.

## SECT. VI.—RABBITS.

THERE are a few rabbit-warrens in Surrey; but none, I believe, on the heathy districts in the west of the county, where certainly they would be proper and profitable.

There is a *hare-warren* near Bansted Downs: it contains about three acres of ground: 200 brace are usually kept in it; they are fed in the summer on clover, rape, &c. and in the winter on hay. The warren is surrounded by a brick wall about ten feet high, with openings at regular distances, within which are wire gratings on hinges: these give way to the hares, when they enter the warren; and they are so constructed, that they immediately close after them, and so prevent their escape.

Digitized by Google

# CHAP. XIV.

## RURAL ECONOMY.

### SECT. I.—LABOUR.

IT is a very general and well-founded complaint in Surrey, that it is extremely difficult to get a sufficient number of hands to work the land properly; and that the servants are extremely unsettled, continually wandering from one master to another. The first circumstance may be accounted for by the vicinity of London, and by the circumstance of Surrey, as an arable county, not managed in the most judicious and economical way with respect to labour, requiring a great number of work-people. The remedy is obvious: to diminish the number of hands, by the introduction of ploughs without drivers; and to employ women and children more generally, by the substitution of drilled turnips instead of broad-cast; as the latter require the skill and experience of a man, whereas the former may easily be well hoed by women and children. The best mode of remedying the other evil complained of, viz. that the farm-servants are continually wandering from one master to another, would be to increase the difficulty and risk of their removing, and to attach them more strongly to the farm: this might in a great measure be effected, by encouraging married servants in preference to unmarried (and the employing their wives and children regularly, would have this effect in some degree); by giving them free cottages, and by rendering their situation more independent of the fluctuations in the value of money, by substituting a certain quantity of corn, or the price of a certain quantity of corn, for part of their money wages. Whatever attached the servant to the farm, either by giving him a kind of interest in it, or by rendering his removal difficult and expensive, would assuredly remedy the evil complained of.

The character of the farm servants in Surrey is variously represented, and indeed, from the peculiar circumstances of different parts of the county, it must be various. By some they are held up as sullen, ill-tempered, lazy, and ignorant; by others, as blunt, honest, and attached to their masters' interest. In travelling over the county, I made it a point to enter into conversation with most of the ploughmen I saw at work, partly in order to inquire into many things, some of which a servant is better able, and others of which he is more willing to tell than his master; and partly to judge for myself of the intelligence and manners of the servants. With scarcely a single exception, I found them not only disposed, but extremely willing and ready to give me information, of which they certainly possessed more than, from what I had heard, I expected to have found. They not only knew and could explain very clearly the system that was followed on the farm, but in general could assign very sufficient and proper reasons for following one practice in preference to another. There was nothing either sullen or impudent in their manners: in short, with the single exception, that they did not appear so active as I have seen farm servants in the other parts of England, there was nothing in their appearance, disposition, or manners, that one would wish away. This, however, applies principally to the farm servants in the middle and remote parts of the county: those that live within the more immediate influence of the metropolis, or who are often sent thither, are not so unexceptionable. But though the farm servants in Surrey are tractable, they are extremely prejudiced against any new practice: in this, indeed, they are countenanced by many of their masters: but even if a Surrey farmer were disposed to try or indroduce any new practices, he would find it very difficult to overcome the prejudices of his servants: their very attachment to his interest would make them set their faces against what their prejudice would represent as sure never to answer.

The wages given to farm servants differs in different parts of the county: in the Weald it is rather lower, perhaps by 1*s*. or 1*s*. 6*d*. in the week, than it is in the central parts of the county: and within six or seven miles of London, it is fully one-fifth higher. In winter the wages are about 2*s*. in the week lower than in the summer half year. When servants are hired by the year and boarded, the wages are from 11*l*. to 15*l*.: by the week, without board, the wages are from 13*s*. to 15*s*. A ploughboy gets nearly the half of a ploughman. A shepherd is allowed from 12*s*. to 15*s*. a week, with one bushel of oats per month for his dog: and in some places, the keep of three or four sheep besides. Women are paid 8*d*. or 9*d*. per day, and a herd-boy, 3*d*. or 4*d*. without meat. These are the general wages in the middle parts of the county: of course, where a servant is expected to superintend the whole management of the farm, or where he is a remarkably good ploughman, his wages are greater.

Labourers generally work by the piece: where they are hired by the week, their wages are from 12*s*. to 14*s*. sometimes 2*s*. 6*d*. per day. Most of the prices of piece-work have been already noted under their different heads: but it may be proper to collect them here.

Hoeing beans the first time, from 7*s*. to 8*s*.; the second time, from 5*s*. to 6*s*. per acre.

Hoeing turnips the first time, from 8*s*. to 9*s*.; the second time, from 6*s*. to 7*s*.

Hoeing carrots three times, from 40*s*. to two guineas; 5*s*. per load for taking them up with the spade, 5*s*. for bunching them, and 2*s*. for washing them.

Reaping or bagging wheat, from 16*s*. to 20*s*. per acre.

Mowing barley and oats, from 2*s*. 6*d*. to 3*s*.

Bagging beans, from 7*s*. to 8*s*.

Hooking pease, from 5*s*. to 7*s*.

Mowing clover-hay, from 3*s*. 6*d*. to 4*s*.

Mowing meadow-hay, from 5*s*. to 5*s*. 5*d*.

Mowing sainfoin-hay, from 3*s*. to 4*s*. 6*d*.

It is evident that the prices of mowing or bagging must vary considerably, according to the state of the crop and the weather at the time of harvest. Some farmers engage harvest men, *i. e.* men to work during the harvest, either at so much during the harvest month, or at so much per week. The wages then are about one guinea per week: the harvest is not reckoned to begin till the wheat is ripe; so that pease and the earlier kinds of oats, being cut down before the regular harvest commences, and beans after it is over, are less expensive.

Thrashing is sometimes done by the day, but more commonly by the quarter: the price varies according to the condition of the crop, and the consequent ease or difficulty with which the corn is separated from the straw.

Wheat is thrashed per quarter for 4*s*. or 5*s*.

Rye at much the same price, rather lower.

Barley and oats, for 2*s*. 6*d*. or 3*s*.

Pease, for 2*s*. or 2*s*. 6*d*.

Beans rather lower, for 1*s*. 6*d*. or 2*s*.

Hay is cut and bound for the market at about 2*s*. 6*d*. or 2*s*. 9*d*. per load.

The water-furrows are cut and cleared at from one halfpenny to 1*d*. per rod, according to the nature of the soil, &c.

A three-foot ditch is made for 1*s*. 6*d*. per rod, if the ground is not stony.

Paring, burning, and spreading the ashes, costs in most cases, from 35*s*. to 40*s*. per acre: but the price here must greatly depend on the condition of the turf, and the nature of the soil.

The hours of work are from six to six in the summer, and from light till dark in the winter. In summer the ploughman goes out at seven and returns at three; his dinner is brought to him in the field: in winter he continues at the plough about six hours.

The principal animal food used by the farm servants, is pork or bacon broiled over the fire. It may be thought, that where a man has a large family to support, it would be much more economical to buy such kind of meat, as, with the assistance of pease or barley, might go a long way in supplying nourishing food, by being made into soup or broth. This was suggested to his servants by a very intelligent farmer in Surrey, but the reply was a satisfactory answer, that the price of fuel was so enormously high, that the additional quantity requisite to boil their meat, would cost more money than would be saved by the different mode of cookery.

It is well known, that labourers in London will spend nearly their whole wages in the purchase of something nice for their palates; and there is some reason to apprehend that this mode of laying out money (than which none can be more despicable and improper), is creeping among the Surrey labourers: at least it is certain, that they are not nearly so economical as they ought to be in the article of food, and that they will too often suffer themselves and their children to go ill clothed, in order to *live well*.

The price of all kinds of provisions is nearly the same as in the London market, except in the more remote parts, where they are cheaper, especially poultry and vegetables. The great increase in the price of provisions within these fifteen or twenty years, and the carelessness and extravagance of farm servants, joined to the trouble they give when in the house, have induced most of the farmers to leave off having any male servants boarded with them.

Coal finds its way into all parts of the county; and near London, where the carriage is easy, and where there is nothing else to burn, it is used even by the cottagers; but in other parts of the county, furze, turf, and peat fires, are most common in all the cottages.

# CHAP. XV.

## POLITICAL ECONOMY.

### SECT. I.—ROADS.

THE turnpike roads in this county are in general not very well attended to, or very judiciously managed. It is true, the materials for their formation are not of the best kind, consisting principally of small flinty gravel, which under the weight of the ponderous and heavily loaded waggons, is speedily crushed to powder. But in many parts of the county, large flints might be procured, which, if they were properly managed, would make a good road. It is objected to the use of flints, that they are too brittle, and consequently are easily ground down, and soon are little, if any thing, superior to gravel: but if a good coat of flints of a proper size be carefully laid on, mixed with a small proportion of chalk, the latter will cement and bind the flints after they are broken, and together they will form a very good road.

The principal causes of the badness of the roads in many parts of Surrey, are, 1st, The want of a proper foundation; 2d, too flat a form; 3d, the suffering the water to stand upon them; 4th, not scraping the mud off them in winter, and the dust in summer; and 5th, the height of the hedges and the overhanging of the hedge-row timber, which prevents the free circulation of the air, and consequently the drying of the roads. In many parts of the county, the roads, even where there is a great deal of traffic upon them, are far too narrow.

With respect to materials, the flints which lie in such great abundance on the Surrey hills, ought to be gathered and used more generally: they are certainly the best the county affords, much superior to the gravel, even when it is carefully sifted from the earth and dust. In the Weald they have a hard blackish stone, considerably larger than the flints, but not equal to them in forming a durable road.

There can be no doubt that on all roads, but especially on such as are formed of soft or brittle materials, the large, heavy, broad-wheeled waggons are very prejudicial: they do not indeed make ruts, but they grind every thing to powder; and thus in the winter time, the roads necessarily become heavy and bad. Besides, when it is necessary to lock their wheels, they tear up the road in a disgraceful manner.

The cross-roads are good on the hills, and in some other parts of the county; but on the clays of the Weald, and on the sands, as well as in the low parts of the county near the Thames, they are very indifferent.

The expense attending the roads may be judged of from the following account of the expenditure of several lines of road, for the seven years commencing February 1795, and ending February 1802.

### I. *Stones-End and Kennington.*

Length of road from Stones-end to Merton and Hazard bridges, 1 mile 5 furlongs 2 poles.

| | Expended. | | |
|---|---|---|---|
| From Feb. 1795 to Feb. 1796, ................ | £. 745 | 18 | 4 |
| 1796 —— 1797, .................. | 686 | 11 | 3 |
| 1797 —— 1798, .................. | 573 | 8 | 1 |
| 1798 —— 1799, .................. | 569 | 8 | 2 |
| 1799 —— 1800, .................. | 1017 | 8 | 2 |
| 1800 —— 1801, .................. | 2127 | 9 | 0 |
| 1801 —— 1802, .................. | 1549 | 18 | 1 |
| | 7270 | 1 | 1 |
| Average of seven years, .......... | £. 1038 | 11 | 7 |

### II. *Croydon Division.*

Length of road from Hazard's bridge to the north end of Streatham parish, on Brixton Causeway-hill, 2 miles 3 furlongs 29 poles.

| | Expended. | | |
|---|---|---|---|
| From Feb. 1795 to Feb. 1796, ................ | £. 183 | 2 | 10 |
| 1796 —— 1797, .................. | 425 | 10 | 11 |
| 1797 —— 1798, .................. | 346 | 2 | 2 |
| 1798 —— 1799, .................. | 352 | 15 | 10 |
| 1799 —— 1800, .................. | 361 | 9 | 3 |
| 1800 —— 1801, .................. | 251 | 8 | 0 |
| 1801 —— 1802, .................. | 227 | 14 | 7 |
| | 2148 | 3 | 7 |
| Average of seven years, ........ | £. 306 | 17 | 8 |

Length of road from Brixton Causeway-hill to Hermitage bridge, 2 miles 2 furlongs 23 poles.

| | *Expended.* | | |
|---|---|---|---|
| From Feb. 1795 to Feb. 1796, ................ | £. 183 | 2 | 10 |
| 1796 —— 1797, ................. | 525 | 11 | 9 |
| 1797 —— 1798, ................. | 346 | 2 | 2 |
| 1798 —— 1799, ................. | 352 | 15 | 0 |
| 1799 —— 1800, ................. | 361 | 9 | 3 |
| 1800 —— 1801, ................. | 251 | 8 | 0 |
| 1801 —— 1802, ................. | 227 | 14 | 7 |
| | 2248 | 3 | 7 |
| Average of seven years, .......... | £.321 | 3 | 4 |

Length of road from Hermitage bridge to Croydon turnpike, 2 miles 4 furlongs 28 poles.

| | *Expended.* | | |
|---|---|---|---|
| From Feb. 1795 to Feb. 1796, ................ | £. 256 | 7 | 9 |
| 1796 —— 1797, ................. | 455 | 16 | 4 |
| 1797 —— 1798, ................. | 485 | 0 | 1 |
| 1798 —— 1799, ................. | 493 | 16 | 2 |
| 1799 —— 1800, ................. | 506 | 1 | 0 |
| 1800 —— 1801, ................. | 351 | 18 | 11 |
| 1801 —— 1802, ................. | 318 | 16 | 3 |
| | 2867 | 16 | 6 |
| Average of seven years, .......... | £. 409 | 13 | 0 |

Total average per annum for the whole Croydon division, 1037*l.* 11*s.* 8*d.*

### III. *East Grinstead Division.*

Length of road from Croydon turnpike to the White Hart at Godstone, 9 miles 1 furlong 19 poles.

| | *Expended.* | | |
|---|---|---|---|
| From Feb. 1795 to Feb. 1796, | £. 498 | 5 | 4 |
| 1796 — 1797, | 563 | 4 | 6 |
| 1797 — 1898, | 560 | 10 | 0 |
| 1798 — 1799, | 546 | 12 | 3 |
| 1799 — 1800, | 624 | 17 | 9 |
| 1800 — 1801, | 491 | 12 | 6 |
| 1801 — 1802, | 535 | 3 | 8 |
| | 3820 | 6 | 8 |
| Average of seven years, | £. 545 | 15 | 3 |

Length of road from the White Hart at Godstone, to Witch-cross, in Ashdown Forest, 14 miles 3 furlongs 26 poles.

| | *Expended.* | | |
|---|---|---|---|
| From Feb. 1795 to Feb. 1796, | £. 747 | 7 | 7 |
| 1796 — 1797, | 744 | 15 | 2 |
| 1797 — 1798, | 980 | 15 | 0 |
| 1798 — 1799, | 959 | 18 | 6 |
| 1799 — 1800, | 1077 | 6 | 7 |
| 1800 — 1801, | 857 | 8 | 7 |
| 1801 — 1802, | 802 | 15 | 5 |
| | 6170 | 7 | 7 |
| Average of seven years, | £. 881 | 9 | 8 |

Total average per annum for seven years for the whole East Grinstead division, 1427*l.* 4*s.* 11*d.*

IV. *Kingston*

## IV. *Kingston Division.*

Length of road from the Plough and Harrow at Newington, to Kingston, 9 miles 7 furlongs 32 poles.

| | *Expended.* | | |
|---|---|---|---|
| From Feb. 1795 to Feb. 1796, ................ £. | 622 | 13 | 4 |
| 1796 —— 1797, ................. | 706 | 19 | 7 |
| 1797 —— 1798, ................. | 1131 | 14 | 9 |
| 1798 —— 1799, ................. | 1199 | 6 | 2 |
| 1799 —— 1800, ................. | 1228 | 19 | 4 |
| 1800 —— 1801, ................. | 854 | 14 | 10 |
| 1801 —— 1802, ................. | 774 | 5 | 3 |
| | 6518 | 13 | 3 |
| Average of seven years, ......... £. | 931 | 4 | 9 |

## V. *Sutton Division.*

Length of road from Merton bridge to the south end of Clapham-common, 2 miles 3 furlongs 24 poles.

| | *Expended.* | | |
|---|---|---|---|
| From Feb. 1795 to Feb. 1796, ................ £. | 233 | 10 | 4 |
| 1796 —— 1797, ................. | 415 | 2 | 8 |
| 1797 —— 1798, ................. | 441 | 5 | 6 |
| 1798 —— 1799, ................. | 649 | 14 | 10 |
| 1799 —— 1800, ................. | 460 | 17 | 2 |
| 1800 —— 1801, ................. | 320 | 10 | 8 |
| 1801 —— 1802, ................. | 290 | 7 | 3 |
| Expended extra within the last two years, | 2339 | 18 | 0 |
| | 5151 | 6 | 5 |
| Average of seven years, ......... £. | 735 | 18 | 0 |

Length of road from the south end of Clapham-common to the town of Sutton, 6 miles 6 furlongs 9 poles.

| | Expended. | | |
|---|---|---|---|
| From Feb. 1795 to Feb. 1796, ................ £. | 389 | 3 | 0 |
| 1796 —— 1797, ................ | 691 | 17 | 2 |
| 1797 —— 1798, ................ | 735 | 9 | 3 |
| 1798 —— 1799, ................ | 749 | 11 | 5 |
| 1799 —— 1800, ................ | 768 | 2 | 3 |
| 1800 —— 1801, ................ | 534 | 4 | 2 |
| 1801 —— 1802, ................ | 483 | 18 | 2 |
| | 4352 | 5 | 5 |
| Average for seven years, ........ £. | 621 | 15 | 0 |

Total average per annum for seven years for the whole Sutton division, 1357*l.* 13*s.*

### VI. *Camberwell and Peckham Roads.*

Length of road from the Elephant and Castle, Newington, to the Fox-under-the-Hill, Camberwell; and from Camberwell-green to the east end of Peckham-lane, 4 miles 15 poles.

| | Expended. | | |
|---|---|---|---|
| From Feb. 1795 to Feb. 1796, ................ £. | 350 | 0 | 0 |
| 1796 —— 1797, ................ | 700 | 0 | 0 |
| 1797 —— 1798, ................ | 900 | 0 | 0 |
| 1798 —— 1799, ................ | 700 | 0 | 0 |
| 1799 —— 1800, ................ | 850 | 0 | 0 |
| 1800 —— 1801, ................ | 700 | 0 | 0 |
| 1801 —— 1802, ................ | 700 | 0 | 0 |
| | 4900 | 0 | 0 |
| Average of seven years, .......... £. | 700 | 0 | 0 |

VII. *Stock-*

### VII. *Stockwell Road.*

Length of road from Vauxhall bridge through Stockwell, to Brixton Causeway, 1 mile 4 furlongs 30 poles.

| | | *Expended.* | | |
|---|---|---|---|---|
| From Feb. 1795 | to Feb. 1796, | £. 60 | 0 | 0 |
| 1796 | —— 1797, | 80 | 0 | 0 |
| 1797 | —— 1798, | 80 | 0 | 0 |
| 1798 | —— 1799, | 130 | 0 | 0 |
| 1799 | —— 1800, | 80 | 0 | 0 |
| 1800 | —— 1801, | 80 | 0 | 0 |
| 1801 | —— 1802, | 80 | 0 | 0 |
| | | 590 | 0 | 0 |
| Average of seven years, | | £. 84 | 5 | 0 |

Total length of road, 58 miles 4 furlongs 7 poles; the total average expense of which is 6576*l.* 14*s.* or about 112*l.* per mile.

*Iron Rail-ways.*—The iron rail-way that has lately been made between Wandsworth and Mestham, is the first instance of the application of this mode of forming roads for general use; the other rail-ways in the kingdom being confined to the carriage of goods belonging to individuals, and not open in the same manner as canals are. The Surrey rail-way was first projected and begun in 1802 and 1803: the part that runs from Wandsworth to Croydon was soon completed, and the success of the undertaking induced the proprietors to carry it on to Mestham.

A large basin, capable of holding more than thirty barges,

Digitized by Google

barges, is made at Wandsworth, for the purpose of forming a junction between the Thames and the rail-way. From this basin, the rail-way with a double line, one for the passage of waggons to Croydon, and the other for the return, is carried in such a manner, as to lie on the ground, where it is naturally level, or nearly so, and to approach the principal of the numerous manufactories which cover the banks of the Wandle. Short branches go off to some of these in different parts of the road between Wandsworth and Croydon. In order that the waggon going in one direction may return at any part of the route, there are at short distances diagonal rail-ways, and a bar of iron moving on a pivot: by turning this bar the waggon can be moved from one line to the other. As it is absolutely necessary that the rail-way should be laid as nearly as possible with a very small inclination, it is obvious, that the greatest expense attending it will arise from forming this where the ground is naturally uneven. As far as Croydon, there was little difficulty or trouble; but on the second part, viz. from Croydon to Mestham, there were many difficulties to be overcome, and much expense incurred: several vallies from ten to thirty feet deep lay in the way, which it was necessary to fill up, and some arches were to be thrown across other parts of the road. A little beyond the Red Lion at Smitham Bottom, they have been obliged to raise a valley above twenty feet perpendicular, and to build an arch sufficiently high to admit the passage underneath of a waggon loaded with hay, &c. from the Downs to Smitham Bottom. In another part of this second division of the rail-way, they have been obliged not only to build an arch, but to hollow the ground out below it, in order that they might at the same time keep the level, by not raising the arch too high, and admit a loaded waggon to pass underneath it.

The breadth of the road which is occupied by the going and returning rail-ways and a foot-path, is twenty-four feet: the rise is one inch to every four bars, or ten feet. The distance from Wandsworth to Croydon by the rail-way, is about ten miles: from Croydon to Mestham, about seven miles.

Of the great advantage of iron rail-ways, so far as respects the ease of carriage, the following trial is a complete proof. "The Surrey iron rail-way being completed and opened for the carriage of goods all the way from Wandsworth to Mestham, a bet was made between two gentlemen, that a common horse could draw 36 tons for six miles along the road, and that he should draw this weight from a dead pull, as well as turn it round the occasional windings of the road. The 24th of July (1805) was fixed on for the trial, when a number of gentlemen assembled near Mestham, to see this extraordinary triumph of art. Twelve waggons loaded with stones, each waggon weighing above three tons, were chained together, and a horse taken promiscuously from the timber-cart of Mr. Harwood, was yoked into the team. He started from near the Fox public-house, and drew the immense chain of waggons with apparent ease to near the turnpike at Croydon, a distance of six miles, in one hour and forty-one minutes, which is nearly at the rate of four miles an hour. In the course of this time he stopped four times, to shew that it was not by the impetus of the descent that the power was acquired; and after each stoppage he drew off the chain of waggons from a dead rest. Having gained his wager, Mr. Banks ordered four more loaded waggons to be added to the cavalcade, with which the same horse again set off with undiminished power; and still further to shew the effect of the rail-way in facilitating motion, he directed the attending workmen, to the number of about fifty, to mount on the waggons, when the horse proceeded without the least distress. After the trials, the waggons were taken to the weighing machine, and it appeared that the whole weight was as follows:

| | *Tons.* | *Cwt.* | *Qrs.* |
|---|---|---|---|
| Twelve waggons, first linked together, .... | 38 | 4 | 2 |
| Four waggons afterwards attached, ......... | 13 | 2 | 0 |
| Supposed weight of fifty labourers, ......... | 4 | 0 | 0 |
| Total, ...................... | 55 | 6 | 2*" |

Notwithstanding the advantages of iron rail-ways with respect to facility and motion, this road does not appear to be much used, nor is it probable that railways will ever come into general use. The expense attending the formation of them, except where the ground is naturally level, is enormous; and it is evident that the advantages, and consequently the gain, are confined to carriage in one direction. The iron rail-way from Croydon to Wandsworth, lies in the neighbourhood of so many extensive manufactures, that it may possibly answer; but the division from Mestham to Croydon, running through a tract of country destitute of manufactures, and having only the lime, fullers-earth, stone, and corn to depend upon at the further extremity, can never pay very well.

---

[*] Annual Register, 1805, Chronicle, p. 408.

## SECT. II.—CANALS.

THERE is good reason to believe that the first locks erected in this kingdom were those on the Wey. Sir Richard Weston, of Sutton, near Guildford, brought this contrivance over with him from the Netherlands, between 1645 and 1650. Under his direction the plan for rendering the Wey navigable from Guildford to Weybridge was formed; a bill for that purpose was brought into Parliament in 1650, and passed in 1651; but the navigation was not carried into execution till towards the end of that century. In 1760 the navigation was extended to Godalming: between this place and Guildford there are four locks: there are ten barges of 45 tons belonging to the inhabitants of Godalming, and eighteen or twenty others occasionally. Timber, plank, hoops, bark, flour, and paper, are sent to London. The navigation separates from the course of the river a little below Purford Lodge: at the time of the formation of the navigation at this place, Purford-park house was found to be between fifty and sixty feet above the Thames[*].

The

---

[*] I have been extremely anxious to collect some information respecting Sir Richard Weston, of Sutton, near Guildford, to whom this country is indebted for the introduction of locks for canals (Aubrey adds turnpikes, and *tumbling bays* for rivers), of clover, and probably of sainfoin and turnips: but every biographical work to which I can get access, is silent respecting him, while they are loquacious on the lives of men whose merits are very inferior. It is probable that Sir Richard Weston went into the Netherlands during the civil wars; he appears, however, to have returned before the Restoration. Aubrey says he introduced clover into England about 1645: the first edition of his "Directions for

The next canal that was made in Surrey, is that from Basingstoke to the Thames. This canal is principally fed by the little river Loddon: it passes out of Hampshire into Surrey near Dradbrook, which divides the counties; it thence turns up to Colingley-moor, and returns by Purbright and Oak-farm into the river Wey, near the village of Westby: it has a fall of 195 feet from Dradbrook to where it runs into the Wey, a distance of about 15 miles. There is a branch over Hook-common to Turgis-green, of six miles, and level. In 1796 the Basingstoke canal was completed, and made navigable to London. Timber is the principal article conveyed by it.

"The Grand Surrey Canal Dock at Rotherhithe has been lately opened. This dock, or basin, will contain about 100 sail of square-rigged vessels, at any draught of water in which they can approach the pool. This public work was first suggested and laid out by Mr. Dodd, the engineer, and an Act of Parliament immediately after obtained for its execution. The dock, and main line of canal, and collateral cuts, are as follows: the ship-dock, immediately communicating with the river Thames, a little below King's-mills, Rotherhithe, gives admission into the grand dock or basin: on the north, south-east, and west sides of the latter, is an extensive site for building wharfs, warehouses, &c.; and in the centre of the dock, a large island for the same purpose, to which there is access by a drawbridge.

---

the Improvement of Barren and Heathy Land, was published about 1650." In this work, the nature, uses, and mode of cultivating clover and turnips, are very fully laid down: it is addressed to his Sons. In the Introduction to Manning, he is said to have died in 1652: Aubrey dates his death in 1653, "in his climacterical year 63."—(*Aubrey*, iii. p. 229).

bridge. The main line of canal, passing from the dock, runs nearly in a south line on the west of Deptford, and from thence in a west line, crossing the Kent, Camberwell, and Clapham roads, enters the Thames again at Vauxhall-creek. Attached to this main line is a collateral cut to Peckham, Horsemonger-lane, Southwark, and Butt-lane, Deptford. The whole of this range of eight miles is upon one entire level, without a lock, and peninsulates the south of the metropolis, with which the Croydon Canal forms a junction. The upper lines and levels of this canal extend from Kennington-common, along the Washway, to Rushey-green, Stockwell, passing in the vicinity of Clapham and Tooting to Mitcham."

The Croydon Canal was first projected in 1800, and the Act obtained for it in 1801. According to the preamble of the Act, the reason for making this canal is, to open a communication for the cheap and ready conveyance of all kinds of commodities from the counties of Sussex, Surrey, and Kent, to the metropolis; and of coals, manure, and other articles, from thence into the country; and to supply the towns of Croydon, Streatham, Dulwich, Norwood, and Sydenham, with water. The canal is to run from near the town of Croydon, through the parishes of Croydon, Battersea, Camberwell, Deptford, and Rotherhithe, and of Beckenham and Lewisham, and the township of Sydenham, into the Grand Surrey Canal in Deptford parish. Mr. Rennie gave in two estimates: one on the plan of a canal, and boats carrying 25 tons burthen, which amounted to 64,100*l.*; the other on the plan of the boats being conveyed from one level to another by inclined planes, amounting to 46,516*l.* The former plan, though much more expensive,

sive, was preferred, and the canal is now completed as far as Norwood.

It is evident that all the canals which are or may be made in this county, if they terminate within it, must depend almost entirely upon the goods conveyed *from* the metropolis for their support: with the exception of the manufactories established near the river Wandle, there are none in the county which can supply a regular and ample carriage from the country to the metropolis. Of the advantage to the county itself from canals, there can be no doubt: the easy and cheap conveyance, even of coals and manure, would be a great means both of improving the land, and increasing the comforts of the inhabitants; but it may be doubted, whether a country purely agricultural, except under very peculiar and favourable circumstances, can maintain a sufficient *export trade* to keep up a canal.

## SECT. III.—FAIRS.

The following is a list of the principal fairs and markets in Surrey:

| *Names of Places.* | *Markets.* | *Fairs.* |
|---|---|---|
| Battersea, | —— | In Easter week, for toys, &c. |
| Bletchingley, | —— | June 22 and Nov. 2, for horses, bullocks, and toys. |
| Bookham, | —— | Old Michaelmas Day, cattle, horses, &c. |
| Camberwell, | —— | August 18, toys. |

| *Names of Places.* | *Markets.* | *Fairs.* |
|---|---|---|
| Chertsey | Wednesday. | First Monday in Lent, horses, cattle, and hops. May 14, horses and cattle. Aug. 6, Sept. 25, horses, cattle, and hogs. |
| Cobham, | —— | March 17, December 11, horses and sheep. |
| Croydon, | Saturday. | July 5, Oct. 2, lambs, sheep, horses, cattle. The October fair is remarkable for the immense quantities of walnuts exposed to sale. |
| Dorking, | Thursday, a very large market for poultry: it is likewise a good meal and corn market. | The day before Ascension Day, formerly one of the largest in England for lambs; now principally for toys. |
| Dulwich, | —— | Monday after Trinity Monday, toys. |
| Egham, | —— | May 30, toys. |
| Epsom, | —— | August 5, toys. |
| Ewel, | There is the name, but very little of the appearance of a market, on Thursday. | May 12, Oct. 29. At the autumn fair, great numbers of lambs, Dorset ewes, and other sheep, are exposed to sale: many saddle-horses, a few cart-horses, hogs, and cattle. |
| Farnham, | Thursday. This was formerly one of the greatest corn markets in this part of England. | Holy Thursday, June 4, horses, cattle, sheep, and hogs. Nov. 13, horses and cattle. |
| Froger-heath, | —— | June 16, pedlars' ware. |
| Godalming, | Wednesday. | Feb. 13, sheep, cattle, horses, hops. July 10, horses, cattle, sheep, and store pigs. |

| *Names of Places.* | *Markets.* | *Fairs.* |
|---|---|---|
| Guildford, | Saturday. This is a great corn market: 250 loads of wheat have been exposed to sale in it. | May 4, Nov. 2, horses, cattle, sheep, and hogs. At the spring fair in the year 1800, there was a very extraordinary number of cattle exposed to sale: the sheep and lambs only amounted to 30,000. |
| Ham, near Richmond, | —— | May 26, pedlars' ware. |
| Haslemere, | Tuesday. | May 12, Sept. 25, horses, cattle, sheep, and hogs. |
| Katherine-hill, | —— | Oct. 2, horses, household goods, and apparel. |
| Kingston, | Saturday. | Thursday, Friday, and Saturday in Whit-week, horses and toys. Aug. 2, horses. Aug. 3 and 4, fruit and pedlary. Nov. 13, is a very large fair for cattle of the Welsh, Scotch, and Irish breeds: it is frequented by farmers from Kent, Sussex, Essex, Hants, Hertfordshire, and Bedfordshire: there is also a great show of hogs, sheep, &c. |
| Leatherhead, | —— | Old Michaelmas Day, Oct. 10, horses, cattle, &c. |
| Limpsfield, | —— | May 22. |
| Lingfield, | —— | May 12, June 29, July 25, Oct. 10, cattle and pedlary. |
| Mitcham, | —— | August 12, toys. |
| Mortlake, | —— | July 19, toys. |
| Peckham, | —— | August 21, toys. |
| Ripley, | —— | Nov. 10, cattle, sheep, pigs, pedlary. |

Riegate,

| *Names of Places.* | *Markets.* | *Fairs.* |
|---|---|---|
| Riegate, | Tuesday. This is a great market for corn, especially wheat. | Whit-Monday, bullocks and horses. First Wednesday in every month, a market for cattle. |
| Thorpe, near Egham, | —— | May 29, pedlary. |
| Walton, | —— | Wednesday in Easter week, horses, cattle, and sheep. |
| Wanbro', near Guildford, | —— | Sept. 4, horses, cattle, sheep. |
| Wandsworth, | —— | Monday, Tuesday, and Wednesday in Whit-week, toys. |
| Woking, | —— | Whit-Tuesday, toys. |
| Wonersh, | —— | July 11, and Oct. 18. The latter, for cattle, is kept at Shamley, in this parish. |

The principal markets are, Guildford, Riegate, and Kingston: the most important fairs, in an agricultural point of view, are those of Croydon, Kingston, and Ewel.

## SECT. IV.—MANUFACTURES.

Although Surrey can by no means be called a manufacturing county, yet from its vicinity to the metropolis, and from the convenience of its streams for water-mills, there are several manufactures of importance established in it.

The river Wandle, the course of which from Croydon to the Thames is not more than ten miles, supplies a great number of flour, paper, snuff, and oil mills, and mills for preparing leather and parchment, and for grinding logwood; and affords excellent water, and convenient grounds on its banks, for very large calico and printing works: the latter are principally in the parishes of Croydon and Mitcham. The flour-mills of Mr. Perry, of Merton, are supposed to be amongst the largest and most complete in England, and have been erected and supplied with water at a great expense and labour.

The river Mole, besides several flour-mills, turns the iron-mills near Cobham, and the flatting-mills at Ember Court. Very extensive and valuable powder-mills lie on the banks of the small stream that rises in Ewel, a little below that place, near Malden.

Paper-mills appear to have been more numerous formerly in this county; but there are still several on the different branches of the Wey.

A very extensive iron-work is carried on at Garrat-lane, in the immediate vicinity of the Wandle, and the rail-way, by Mr. Henckell.

At Godalming are very considerable manufactories for weaving all kinds of stockings; and latterly, the manufactory of the patent fleecy hosiery has been established here: there are also manufactories for combing wools, and making worsteds, blankets, tilts, and collar-cloths.

At Stoke, near Guildford, a saw-mill for staves, ship-pins, &c. was erected some years since.

A manufactory of Delft and stone ware was established at Mortlake upwards of 60 years ago.

"The inhabitants of Riegate, till about 60 years past, carried on a considerable trade in oatmeal, 20 mills being then employed; whereas there is but one now*."

Mr. Evelyn, in his letter to Aubrey, informs us, that the first mills in England for casting, hammering, and wiring brass, were erected at Wotton: the mode in which the operations were performed, shews the rude state of knowledge and machinery at that time. "First (says he) they drew the wire by men sitting harnessed in certain swings, taking hold of the brass thongs fitted to the holes, with pincers fastened to a girdle which went about them, and then with stretching forth their feet against a stump, they shot their bodies from it, closing with the plate again: but afterwards this was quite left off, and the effect performed by an *ingenio* brought out of Sweden.

There were formerly very extensive iron works in the Weald, but there are now none left. A good deal of charcoal is manufactured there.

"On the site of Bolingbroke-house (Battersea) was erected some years since, a horizontal air-mill of a new construction, and of very large dimensions: the shape of the dome or case, which contains the moveable machine, is that of a truncated cone, being circular of 52 feet diameter at the bottom, and 45 at the top: the height of the main shaft is 120 feet, that is, 40 feet from the floor to the bottom of the dome, and 80 feet thence to the top. The moveable machine is of the same shape, and nearly of the same dimensions as the dome, having just space to turn round within it: the extremities of this machine are called *floats*, as in the wheel of a water-mill: the pieces of wood which connect them with the main shaft, are called the *arms:* there are ninety-six floats, and the same number of shutters in the dome, which, when open, admit, even when there is little wind, a sufficient current of air to turn the machine, and by a particular contrivance, shut, when the wind is so violent as to endanger the structure. This mill, at its first erection, was used for the preparing of oil: it is now used as a corn mill, and is occupied by Messrs. Hodgson and Co.*"

---

* Manning's Surrey.

There are several distilleries in Surrey in the neighbourhood of London, on a very extensive scale, particularly at Battersea and Lambeth: at the latter place are manufactories for making patent shot and artificial stone. In short, it would be almost impossible to enumerate all the different manufactures that are carried on in the Borough of Southwark and the immediate vicinity of the metropolis.

Most, if not all of these manufactures, being in a great measure independent of the fluctuations of trade, partly from the nature of the articles manufactured, and partly from the constant and regular demand created in London, are free from one of the most serious and increasing evils attendant on the manufacturing system in many other parts of the kingdom. The workmen are not only seldom out of employ, but their wages and employment are regular and constant, so that poverty and idleness, which result from the stoppage of vent, or from great extremes in the price of wages, are not nearly so frequent here as in other manufacturing districts.

---

* Lysons' Environs of London, i. p. 46.

## SECT. V.—THE POOR.

BEFORE the great scarcity and consequent dearness of provisions, which took place in 1799-1800, the spirit of the peasantry in many parts of Surrey was so high and independent, that they considered it a disgrace to be supported by the poor-rates. That scarcity, beside other evils of a temporary and less fatal nature, may justly be regarded as the cause of the subdued spirit and industry of many of the peasantry: no longer looking to parish support as a stain on their character, they no longer exert their usual industry and economy to avoid it. The next step in degradation, in ruining themselves and burdening the country, is to look to parish support as a matter of right.

*Annual Receipt and Expenditure.*—The following facts and circumstances, drawn from the Report presented to the House of Commons, will illustrate this subject in a very ample manner.

1. Returns were given in from 151 parishes or places. In the abstract of the returns for the year 1785, there were returns from 149 parishes: in the abstract for 1776, there were 141.

2. Ninety-nine parishes or places maintain all or part of their poor in work-houses: the number of persons so maintained during the year ending Easter 1803, was 5268, and the expense amounted to 75,105*l.* 13*s.* 9¾*d.* being at the rate of 14*l.* 5*s.* 1¼*d.* for each person maintained in this manner. It appears from the abstract of the return 1776, that there were then sixty-

eight work-houses, capable of accommodating 4770 persons.

3. The number of persons maintained out of work-houses at the same time, was 30,870, besides 6895 who were not parishioners. The expense incurred for their maintenance was 58,735*l.* 2*s.* 1¼*d.* A large proportion of those who were not parishioners appears to have consisted of vagrants, and therefore it is probable that the relief given to this class of poor could not exceed 2*s.* each, amounting to 689*l.* 10*s.*: this deducted from 58,735*l.* 2*s.* 1¼*d.* leaves 58,045*l.* 12*s.* 1½*d.* being at the rate of 1*l.* 17*s.* 7¼*d.* for each person relieved out of the work-houses.

4. The number relieved both in and out of the work-houses amounted to 36,138, besides those who were *not parishioners*: excluding their expenses, all other expenses reach 141,686*l.* 8*s.* 6¼*d.* being at the rate of 3*l.* 18*s.* 5*d.* for each person.

5. The resident population in 1801, was 269,043. Of each 100, thirteen were relieved: seven in each 100 belonged to friendly societies.

6. 13*s.* 3½*d.* was raised *a-head by rates*: the whole expenditure on account of the poor, amounted to 10*s.* 7*d.* per head of the population.

7. The expenditure in law, removals, expenses of overseers, &c. reached 8535*l.* 2*s.* 6¼*d.*: according to the returns in 1785, it amounted to 3209*l.* 19*s.* 7*d.*

8. The expenditure in purchasing materials for employing the poor, was 1611*l.* 2*s.* 2¼*d.* In 1785, it was 731*l.* 12*s.* 11*d.*

9. The poor of eighteen parishes were farmed or maintained under contract.

The poor of the parish of Frensham, including the tithing of Chert, are farmed at 600*l*. per annum: with this condition, that 10*s*. a week are added to the said sum for every 1*s*. flour advances per bushel, and 10*s*. taken away for every 1*s*. it is lower.

Mr. Thomas Palmer, overseer at Cheam, remarks that the plan he adopted was, that each person in every family should be provided with the means of procuring half a peck of bread a week, together with 6*d*. per head for other necessaries, if the family consisted of five or more; 7*d*. if it consisted of four, 8*d*. if three, and 9*d*. if less than three: if the earnings of each family did not supply the means, the parish made up the deficiency.

The poor in the parish of Wallington, a hamlet in Beddington, are farmed at a work-house in Southwark, at 5*s*. 6*d*. per head per week.

The poor in the work-house at Warplesdon are maintained under contract; the contractor receives 2*s*. 9*d*. per head per week, when *seconds* are at 9*s*. per bushel: there is an increase or diminution of 1½*d*. per head per week, on every 1*s*. per bushel above or below 9*s*. The contractor has also the earnings of the poor, and 20*l*. per annum stipend.

The poor of the parish of St. Thomas's, Southwark, are farmed at 5*s*. per head per week.

10. The poor of seven parishes are maintained and employed under the regulations of special Acts of Parliament.

11. Two hundred and sixty friendly societies have been enrolled at the Quarter Sessions pursuant to 33 George III. c. 54, and 35 George III. c. 3.

There are sixteen female friendly societies, containing 1845 members, viz. in the parish of St. Olave's, two societies, containing 1200 members; in St. Saviour's, viour's, three, containing 105; in St. Thomas's, one, containing fifty; in Berdmondsey, four, containing 216; in Mortlake, one, containing 44; in Bramley, one, containing 56; in Shalford, one, containing 35; in Wonersh, one, containing 80; and in Godalming, two, containing 59.

12. Before the Property Tax passed, the general professed proportion of the rent, at which the rates were levied, was two-thirds, and it continues so in the hundreds of Woking, Blackheath, Godalming, and the town of Guildford; but in most other parts, and particularly in the hundreds of Kingston, Elmbridge, Riegate, Tanridge, and Wallington, the parishes, since the passing of the Property Act, have been assessed at the rack-rental.

In eleven parishes, the rate in the pound is stated on the rack-rental: the amount of money raised in these parishes is 7494*l.* 9*s.* 5¾*d.*: the amount of rack-rental as computed therefrom, is 36,473*l.* 5*s.* 3¾*d.* consequently the average rate in the pound, on this rental, is 4*s.* 1¼*d.*

## SECT. VI.—POPULATION.

The increase in the population of this county, which it will appear from the following statements, has taken place during the last century, may probably be attributed in some measure to the increase in the number of houses in the neighbourhood of London, and to the establishment or extension of different manufactures there: no inconsiderable part of the increase belongs no doubt to the Borough of Southwark, and it is probable that, in the interior of the county, particularly in the Weald, the increase has not been great.

In the year 1700, the population of Surrey was estimated at 154,900; in 1750, it had increased to 207,100; and in 1801, by the Returns under the Act of Parliament, it was found to be 269,043. The following table gives the particulars of each hundred, and of the number of inhabitants employed in agriculture, and those in trade, &c.

*A Table of the Population of the County of Surrey, according to the Returns under the Act of Parliament, in 1801.*

| *Hundred, Township, &c.* | *Inhabited Houses.* | *By how many Families occupied.* | *Males.* | *Females.* | *Chiefly employed in Agriculture.* | *Ditto in Trade or Handicraft.* | *Total of Persons.* |
|---|---|---|---|---|---|---|---|
| Hundred of Blackheath, - | 1,118 | 1,231 | 3,304 | 3,064 | 2,444 | 493 | 6,368 |
| Brixton, - - - - | 17,647 | 25,712 | 45,752 | 54,998 | 3,124 | 16,979 | 100,750 |
| Copthorn and Effingham, | 1,485 | 1,799 | 4,307 | 4,396 | 1,814 | 883 | 8,703 |
| Elmbridge, - - | 962 | 1,062 | 2,711 | 2,631 | 795 | 567 | 5,342 |
| Farnham, - - | 1,085 | 1,236 | 3,027 | 3,186 | 1,184 | 713 | 6,213 |
| Godalming, - - | 1,257 | 1,440 | 3,932 | 4,092 | 1,433 | 929 | 8,024 |
| Godley and Chertsey, - | 1,528 | 1,686 | 4,154 | 4,329 | 2,773 | 1,444 | 8,483 |
| Kingston, - - | 2,112 | 2,615 | 5,404 | 6,418 | 854 | 1,293 | 11,822 |
| Riegate, - - - | 1,366 | 1,584 | 3,970 | 3,778 | 2,469 | 548 | 7,748 |
| Tanridge, - - | 1,179 | 1,269 | 3,602 | 3,702 | 3,189 | 891 | 7,304 |
| Wallington, - - | 2,537 | 2,914 | 7,098 | 7,494 | 1,603 | 1,547 | 14,592 |
| Woking, - - - | 1,470 | 1,668 | 4,177 | 4,037 | 2,047 | 612 | 8,214 |
| Wotton, - - - | 928 | 1,032 | 2,754 | 2,644 | 1,111 | 502 | 5,398 |
| Town of Guildford, - | 464 | 579 | 1,242 | 1,392 | 28 | 495 | 2,634 |
| Borough of Southwark, - | 10,933 | 17,868 | 31,704 | 35,744 | 135 | 15,037 | 67,448 |
| Total, - - | 46,[illegible]72 | 63,67[illegible] | 127,138 | 141,905 | 22,746 | 42,365 | 269,043 |

From this table it appears, that in the four hundreds of Blackheath, Copthorn or Effingham, Godalming, and Tanridge, and in the Borough of Southwark, the average number of inhabitants to a house rather exceeds six;

six: in the other hundreds, and in the town of Guildford, it rather falls short of six.

Mr. Lysons informs us, that in order "to ascertain as nearly as possible the present state (1792) of population in the several parishes near London, an accurate account of the number of houses and inhabitants has been procured in three pretty large villages, viz. Mortlake, Putney, and Wandsworth: the numbers are as follows:

| | *No. of Houses.* | *No. of Inhabitants.* |
|---|---|---|
| Mortlake, | 301 | 1766 |
| Putney, | 440 | 2294 |
| Wandsworth, | 690 | 4554 |
| Total number, | 1431 | 8614 |

"Upon making the calculation, the average number of inhabitants to a house in the parishes jointly, will be found to be $6\frac{28}{1431}$, that is, about $6\frac{1}{50}$: the average of six to a house, therefore, will perhaps give a pretty fair view of the present state of population near London: Clapham, perhaps, is almost a single instance where the average is nearly seven. In most parishes, the houses have been actually numbered; and in all, they have been calculated as nearly as possible." Mr. Lysons then proceeds to give a table of the number of houses, and of inhabitants, in all the villages in Surrey treated of in his book, grounded on the preceding actual enumeration. Before we give this, we shall extract from the Return to Parliament in 1801, the number of houses and inhabitants in the three parishes of Mortlake, Putney, and Wandsworth.

| | No. of Houses. | No. of Inhabitants. |
|---|---|---|
| Mortlake, | 328 | 1748 |
| Putney, | 626 | 2428 |
| Wandsworth, | 720 | 4445 |
| Total, | 1674 | 8621 |

Hence it will appear, that there is an increase of 243 in the number of houses, and an increase only of seven in the number of inhabitants. This may be accounted for, either by supposing that the number of inhabitants was not accurately taken in 1801; that it was taken at a time when many of the families were in London; or that by the increase of wealth, the same population is divided among a greater number of houses.

We shall now give the table of Mr. Lysons, before alluded to; and at the same time, the returns of houses and inhabitants for the same parishes, taken from the Parliamentary Return of 1801.

| | *Mr. Lysons' Table, 1792.* | | *Parliamentary Abstract, 1801.* | |
|---|---|---|---|---|
| | *No. of Houses.* | *Inhabitants.* | *Houses.* | *Inhabitants.* |
| Addington, .... | 22 | 132 | 36 | 178 |
| Barnes, ......... | 150 | 900 | 160 | 860 |
| Battersea, ...... | 360 | 2,160 | 605 | 3,365 |
| Beddington,.... | 100 | 600 | 62 | 353 |
| Bermondsey, | 3,100 | 18,600 | 3,137 | 17,169 |
| Camberwell, | 772 | 4,632 | 1,162 | 7,059 |
| Clapham, ...... | 384 | 2,700 | 480 | 3,864 |
| Carshalton, .... | 165 | 990 | 237 | 1,449 |
| Cheam, ......... | 61 | 366 | 97 | 616 |
| Croydon, ...... | 800 | 4,800 | 1,020 | 5,743 |
| Kew, ............. | 80 | 480 | 72 | 424 |
| Kingston, ...... | 750 | 4,500 | 676 | 3,793 |
| Lambeth, ...... | 4,130 | 24,780 | 4,789 | 27,939 |
| Malden, ......... | 22 | 132 | 24 | 210 |
| Merton, ......... | 116 | 696 | 147 | 813 |
| Mitcham, ...... | 540 | 3,240 | 640 | 3,466 |
| Morden, ........ | 65 | 390 | 65 | 512 |
| Newington, .... | 1,800 | 10,800 | 2,865 | 14,847 |
| Petersham, .... | 53 | 318 | 59 | 422 |
| Richmond, .... | 815 | 4,890 | 823 | 4,628 |
| Rotherhithe, | 1,600 | 9,600 | 1,680 | 10,296 |
| Streatham, .... | 265 | 1,590 | 386 | 2,357 |
| Sutton, ......... | 100 | 600 | 93 | 579 |
| Tooting, ........ | 150 | 900 | 163 | 1,189 |
| Wimbledon, | 230 | 1,380 | 250 | 1,591 |
| | 16,610 | 87,776 | 19,728 | 113,182 |

From this table it appears, that the increase in the number of houses bears a very different proportion to the increase in the number of inhabitants, from that already alluded to with respect to the houses and inhabitants of Mortlake, Putney, and Wandsworth: 19,728, the number of houses in 1801, would require 104,217, as the proportional number of inhabitants, according to their relative proportions in Mr. Lysons' table; whereas the actual number of inhabitants was 113,182: so that the inhabitants increased in a greater proportion than the houses.

Clapham, which Mr. Lysons found to contain on an average nearly seven inhabitants to a house, appears, from the table of 1801, to contain rather more than eight; Malden, very nearly nine; and Tooting, Petersham, and Morden, rather more than seven; while Addington does not reach five.

The following table exhibits the baptisms and burials in the county of Surrey every tenth year, from 1700 to 1790, and every year from that period till 1800; and the marriages every tenth year, from 1760 to 1790, and every year from that period till 1800. It is taken from the Parliamentary Return.

| *Year.* | *Baptisms.* | *Burials.* | *Marriages.* |
|---|---|---|---|
| 1700 | 4016 | 4400 | — |
| 1710 | 4054 | 5344 | — |
| 1720 | 4748 | 5675 | — |
| 1730 | 4544 | 6074 | — |
| 1740 | 4521 | 6562 | — |
| 1750 | 5366 | 5940 | — |
| 1760 | 4936 | 5652 | 1398 |
| 1770 | 5517 | 6603 | 1529 |
| 1780 | 5437 | 6130 | 1516 |
| 1790 | 6794 | 5632 | 1981 |
| 1791 | 6767 | 6318 | 1964 |
| 1792 | 7027 | 6196 | 2099 |
| 1793 | 7055 | 6965 | 1949 |
| 1794 | 6889 | 6573 | 1934 |
| 1795 | 7100 | 6745 | 1953 |
| 1796 | 7212 | 6312 | 1987 |

| *Year.* | *Baptisms.* | *Burials.* | *Marriages.* |
|---|---|---|---|
| 1797 | 7462 | 5871 | 1898 |
| 1798 | 7325 | 6187 | 2042 |
| 1799 | 7180 | 6701 | 2097 |
| 1800 | 6838 | 7327 | 1984 |

Till the year 1787, the burials, with only one or two exceptions, exceeded the baptisms: from 1787, with the single exception of 1800 (the year following the bad weather and bad crop of 1799), the baptisms exceed the burials. In that year (1800), the baptisms fall off a little, and the burials are much increased. In the returns for London, Westminster, and Southwark, there is a similar falling off of baptisms, and increase of burials, in the year 1800: the same is the case in the returns for the whole of England. In Wales, the baptisms are fewer than for 17 years preceding, and the burials more numerous than for seven years.

The average number of deaths, taken from the registered accounts of them for 10 years, amounted to 1 in 41 of the resident population.

The following table, which exhibits the population and the number of deaths in each hundred in 1801, will prove that the mortality that year was considerably above the average.

| *Hundreds.* | *Population.* | *Deaths.* |
|---|---|---|
| Blackheath, | 6,368 | 102 |
| Brixton, | 100,750 | 2,764 |
| Copthorn and Effingham, | 8,703 | 155 |
| Elmbridge, | 5,342 | 66 |
| Farnham, | 6,213 | 105 |
| Godalming, | 8,024 | 143 |
| Godley and Chertsey, | 8,483 | 200 |
| Kingston, | 11,822 | 307 |
| Riegate, | 7,748 | 156 |
| Tanridge, | 7,304 | 159 |
| Wallington, | 14,592 | 404 |
| Woking, | 8,214 | 185 |
| Wotton, | 5,398 | 31 |
| Guildford, | 2,634 | 82 |
| Southwark, | 67,448 | 2,468 |
| | 269,043 | 7,327 |

When the list of deaths was made up, the returns were not procured from Ashted, Cobham, Dorking, Horley, Leatherhead, Newdigate, and Streatham: they were afterwards got, and found to amount to 207. The returns from Capel, Dalborn, Esher, Okewood, and Shire, were not sent in; but calculating the deaths in these parishes, according to the average proportions of the population and deaths in the rest of the county, and adding them and the 207 to 7327, we shall find that in 1800, nearly 1 in 35 died.

The following tables of the comparative state of population, drawn from the births and burials in the parishes comprehended in Lysons' Environs of London, are extracted from that work.

### *Addington.*

| *Years.* | *Births.* | *Burials.* |
|---|---|---|
| 1580—1589 | 4 | 3 |
| 1780—1789 | 7 | 4 |

### *Barnes.*

| | | |
|---|---|---|
| 1600—1609 | 8 | 7 |
| 1680—1689 | 17 | 23 |
| 1780—1789 | 28 | 34 |

### *Battersea.*

| | | |
|---|---|---|
| 1580—1589 | 13 | 7 |
| 1680—1689 | 58 | 68 |
| 1780—1789 | 60 | 69 |

### *Bermondsey.*

| | | |
|---|---|---|
| 1549—1558 | 32 | 57 |
| 1580—1589 | 74 | 85 |
| 1680—1689 | 334 | 481 |
| 1780—1789 | 418 | 498 |
| 1790 | 450 | 417 |
| 1791 | 474 | 511 |

### *Beddington.*

| | | |
|---|---|---|
| 1580—1589 | 9 | 7 |
| 1680—1689 | 8 | 11 |
| 1780—1789 | 22 | 17 |

*Camber-*

Digitized by Google

### *Camberwell.*

| *Years.* | *Births.* | *Burials.* |
|---|---|---|
| 1580—1589 | 23 | 26 |
| 1680—1689 | 36 | 52 |
| 1780—1789 | 120 | 143 |

### *Carshalton.*

| | | |
|---|---|---|
| 1580—1589 | 10 | 6 |
| 1680—1689 | 14 | 18 |
| 1780—1789 | 33 | 33 |

### *Cheam.*

| | | |
|---|---|---|
| 1580—1589 | 6 | — |
| 1680—1689 | 10 | 11 |
| 1780—1789 | 12 | 14 |

### *Clapham.*

| | | |
|---|---|---|
| 1580—1589 | 3 | 3 |
| 1680—1689 | 16 | 25 |
| 1780—1789 | 60 | 69 |

### *Croydon.*

| | | |
|---|---|---|
| 1580—1589 | 67 | 43 |
| 1780—1789 | 150 | 130 |
| 1730—1750 | 116 | 137 |
| 1760—1780 | 127 | 129 |

### *Kew.*

| | | |
|---|---|---|
| 1714—1724 | 7 | 9 |
| 1780—1789 | 10 | 14 |

### *Kingston.*

| *Years.* | *Births.* | *Burials.* |
|---|---|---|
| 1680—1689 | 96 | 98 |
| 1770—1779 | 130 | 115 |
| 1780—1789 | 113 | 113 |
| 1790 | 139 | 95 |
| 1791 | 147 | 129 |

### *Lambeth.*

| | | |
|---|---|---|
| 1580—1589 | 74 | 90 |
| 1680—1689 | about 185 | about 265 |
| 1780—1789 | 510 | 629 |
| 1780—1785 | 473 | 625 |
| 1785—1789 | 547 | 633 |
| 1790 | 632 | 626 |
| 1790 | 618 | 620 |

### *Malden.*

| | | |
|---|---|---|
| 1680—1689 | 2 | 2 |
| 1780—1789 | 11 | 5 |

### *Merton.*

| | | |
|---|---|---|
| 1580—1589 | 4 | 4 |
| 1766—1775 | 18 | 11 |
| 1784—1789 | 24 | 20 |

### *Mitcham.*

| | | |
|---|---|---|
| 1680—1689 | 29 | — |
| 2780—1789 | 97 | 94 |

*Mortlake.*

### *Mortlake.*

| *Years.* | *Births.* | *Burials.* |
|---|---|---|
| 1680—1689 | 31 | 40 |
| 1780—1789 | 45 | 52 |

### *Newington.*

| | | |
|---|---|---|
| 1680—1689 | 158 | 221 |
| 1780—1789 | 204 | 332 |

### *Petersham.*

| | | |
|---|---|---|
| 1682—1691 | 3 | 8 |
| 1780—1789 | 9 | 20 |

### *Putney.*

| | | |
|---|---|---|
| 1620—1629 | 23 | 26 |
| 1680—1689 | 50 | — |
| 1730—1739 | 56 | 65 |
| 1780—1789 | 56 | 69 |
| 1790 | 78 | 48 |
| 1791 | 72 | 69 |

### *Richmond.*

| | | |
|---|---|---|
| 1682—1691 | 62 | 65 |
| 1780—1789 | 128 | 117 |
| 1790 | 129 | 115 |
| 1791 | 134 | 110 |

### *Rotherhithe.*

| | | |
|---|---|---|
| 1680—1689 | 151 | 160 |
| 1780—1789 | 341 | 266 |
| 1790 | 376 | 284 |
| 1791 | 388 | 265 |

### *Streatham.*

| *Years.* | *Births.* | *Burials.* |
|---|---|---|
| 1580—1589 | 11 | 8 |
| 1680—1689 | 20 | 25 |
| 1780—1789 | 42 | 63 |

### *Sutton.*

| | | |
|---|---|---|
| 1680—1689 | 10 | 10 |
| 1780—1789 | 16 | 12 |

### *Tooting.*

| | | |
|---|---|---|
| 1580—1589 | 6 | 3 |
| 1680—1689 | 5 | 6 |
| 1780—1789 | 31 | 24 |

### *Wandsworth.*

| | | |
|---|---|---|
| 1603—1612 | 37 | 38 |
| 1780—1789 | 134 | 136 |
| 1790 | 152 | 114 |
| 1791 | 131 | 159 |

### *Wimbledon.*

| | | |
|---|---|---|
| 1680—1689 | 16 | 14 |
| 1780—1789 | 36 | 43 |
| 1790 | 39 | 38 |
| 1791 | 37 | 35 |

The number of inhabitants on each square mile through the county of Surrey, averages 332.

*Healthiness of the District.*—Surrey may be esteemed as on the whole a very healthy county: in the neighbourhood of the Downs, it is indeed considered so favourable to health, from the purity of its air and the dryness of its soil, that this part is frequently resorted to with great success by invalids. In the neighbourhood of Bagshot, I heard of a Dame Taylor, who was said to be 120 years old. Even in the Weald, where the surface is flat and low, the soil moist, and the ground blocked up from free and regular ventilation by the quantity of timber, diseases are by no means frequent, nor did I hear that life was shortened within the usual limit of existence.

## CHAP. XVI.

### OBSTACLES TO IMPROVEMENT.

MOST of these have been already pointed out in the course of the Work. The system of common-fields: the short duration or improper covenants of leases, and in some respects, tithes, may be regarded as the principal obstacles to improvement. To these may be added the ignorance and prejudice of many of the farmers; and in the Weald, the want of sufficient capital.

# CHAP. XVII.

## MEANS OF IMPROVEMENT.

THESE may be considered either as relating to the county at large, or as applicable exclusively to the Weald, which, from its peculiar situation and soil, requires particular methods to improve it.

With respect to the county at large, the steps to improvement in their natural and proper course are, 1. a better system, and more economical practice, on the lands already enclosed; 2. the enclosing of the common-fields; and, 3. the enclosing of the commons.

Many people strongly recommend the enclosing of the commons in the first instance, and even go so far, as to hold out the necessity of giving a bounty to hasten and extend their culture: this appears, however, injudicious: all that is necessary is, to remove the impediments which lie in the way of dividing and cultivating the commons; and then, when there is a demand for their produce, they will soon be brought into cultivation: but to hold out a bounty to induce farmers to cultivate them, is, in fact, to encourage the laying out of labour and capital, without a certainty of a market for the produce; or, at least, to withdraw them from the culture of ground that would pay better.

It is certainly of much more immediate consequence, to direct the labour and capital already embarked in agriculture with the greatest skill, than to entice the investiture of more, before agricultural knowledge is improved. Very little more labour or capital, perhaps no more, are required, than are now employed in the cultivation of the enclosed land, assisted by greater skill, in order to increase the produce; but where commons are to be enclosed, divided, and brought into cultivation, and even where common-fields are to be divided and enclosed, additional capital must be employed; and unless the general system of the county be improved before these enclosures take place, this additional cpital will not be laid out to the best advantage.

It appears, therefore, that before the commons at least are brought into cultivation, it would be advisable to direct the attention of the agriculturist to the improvement of the system he pursues; and induce him to cultivate what he has, *well*, before he takes more into his hands.

The improvements which the husbandry of Surrey appears to require are, 1. a saving of labour; 2. a more regular and general attention to a proper system of cropping; and, 3. greater attention to keeping the ground clean, and in good condition.

1. With regard to the saving of labour; this certainly might be effected by the introduction of two-horse ploughs—universally and immediately on the light lands, and gradually on the stronger soils. To introduce them at once upon the strong soils, would probably be the means of their being considered as improper, even for the lighter soils: they have much prejudice to overcome, and nothing should be done that would serve to strengthen that prejudice. A saving of labour, necessarily accompanying the introduction

of two-horse ploughs, would arise, from there being no longer any occasion for a driver; and in a county where *hands* are scarce, and where many slovenly practices (such as harvesting their barley loose) are pursued, principally on account of the scarcity of hands, whatever change would be the means of giving a spare hand on the farm, ought to be adopted, if not otherwise prejudicial. Drilling of turnips, besides its other advantages already pointed out, would set free many men, and give employment to the women and children on a farm.

To those who have witnessed the powers of a horse when yoked singly in a cart, and compared them to the powers of a horse when preceded or followed by three or four more, there can be little doubt that for all the purposes of a farm, small light carts, drawn by one, or at the most, two horses, ought to be substituted for the ponderous and uncouth waggons now in use. Indeed the fondness for large, uncouth, or complicated agricultural implements, ought to give way to the use of such as are simple and light: for there can be little doubt that in every employment, and perhaps above all others in agricultural, no mechanical instrument can be too simple.

2. By many of the Surrey farmers, a proper system of cropping, *i. e.* a system founded on the principle of never taking two white crops together, is regularly pursued; but by others it is totally neglected; and yet no maxim in agriculture is better established than this: whether the farmer looks to good crops, clean land, or a saving of manure and labour, his surest method of gaining his wish is, to grow white and green crops alternately.

3. Greater attention should be given to keeping the

land clean, and in good condition: many of those who farm light soils, are extremely inattentive to the proper and regular cleaning of it; and most of the farmers in the Weald, as well as some in other parts of the county, *run their land out* completely, before they think of giving it additional manure.

Besides these general points, to which the attention of the Surrey farmers at large ought to be directed, those in the neighbourhood of the Downs and chalk-hills should cultivate sainfoin on a more extended scale, and as a regular part of their rotation: the clays in the northern parts of the county should be regarded with a more favourable eye, and have more justice done them in ploughing, draining, and manuring. The advantages resulting from improving the breed, and being more attentive to the management of sheep, are beginning to be understood; but in many parts, sheep are still regarded merely as *dung-carriers;* and if they serve to manure a certain portion of land yearly, and barely pay for their feed, nothing more is looked to. Where sheep are kept solely with these objects and prospects in view, they are comparatively of little use to the farmer: when they are considered and treated as a valuable part of the capital on the farm, we may be sure agriculture has advanced one important step towards perfection.

The climate and soil of Surrey (omitting for the present the Weald) do not seem adapted for pasture; and probably under permanent grass, would not pay so well as under permanent tillage: but there can be no doubt that many parts of the county would be greatly benefited, by being laid down to grass for a few years. When tillage land has been extremely well managed—well and carefully ploughed, judici-

ously

Digitized by Google

ously cropped, and liberally manured—there may be no occasion to have recourse to pasture; but if, on the contrary, it has been neglected, run out, and injudiciously cropped, one of the best modes of restoring it is to lay it down, well prepared and manured, for a few years.

Any method that would draw the connexion between the farmer and his servants more close and strict, would certainly be of great service to such a county as Surrey, where, from the vicinity of the metropolis, the servants, from the prospect of greater wages, or from the influence of temptation, are too frequently leaving their masters. It has been already remarked, and indeed it is very obvious, that much more dependence may be placed upon the steadiness and permanency of a married than an unmarried servant: whatever motives, therefore, will induce the farmers' servants to marry, will not only in all probability improve their morals, but also fix them more closely to the farm. If, then, it were the practice for the farmers to make their servants in a great measure independent of the fluctuations in the value of money, by paying part of their wages according to the price of grain; if a free cottage were allotted to each; and if, moreover, their interest in the farm were increased, by being allowed to keep a cow—they would not only have little temptation to remove, but they would even be deterred, by the difficulty and trouble to which unmarried men are not exposed.

Even though the evil of servants frequently leaving their masters, were not entirely removed by the adoption of the above plan, there can be little doubt that it would preserve them better from the attacks of poverty, and lessen the burden of the poor-rates. If the farmers servants were encouraged to marry, and if their wives and children were furnished even with the temporary employment which the hoeing of drilled turnips would afford, in addition to what they already have, their condition and their character would both be much benefited; and as they improved, they would be under less necessity, and feel less disposed, to become a burden on the parish.

These are not crude and fanciful speculations: the plan is recommended, not merely because it is plausible, but because, after having been long and extensively acted upon in the North of England, and the South-east of Scotland, it is found there to answer: no farm-servants are equal to the married ones there, for sobriety, steadiness, close and faithful application to their masters' business, and economy in their own concerns.

There are several other points in which the rural economy of Surrey might be improved; but as these are of minor importance, and have already been touched upon in the course of this Work, there seems no necessity to enter on them again in this place: it is of more importance to consider, by what means improvements may be introduced and established.

The method that is most obvious, is that of disseminating the knowledge of the practices and implements of the best-farmed districts, by means of agricultural publications: the good effects resulting from this mode are already begun to be experienced, and aided as it is by the increased ability and willingness of the farmers to read and understand such publications, it must ultimately be very beneficial. But even this mode is not adequate of itself to dispel the prejudice which appears to be peculiarly strong amongst agricultural men, against the introduction and use of any thing new. If an improvement takes place in any branch of manufactures, the knowledge of it rapidly spreads through the kingdom, and it is no sooner known than it is adopted: the reverse of this, however, is the case in agriculture. The slowness and difficulty with which agricultural improvements travel, are sufficiently instanced by many striking facts: the winnowing machine has been used for nearly a century in the South-east of Scotland, and in the northern part of Northumberland: its superior utility, in every point of view, is obvious and striking, and yet it is unknown in many counties; and where it is known partially, as in Surrey, it appears to be making its way with difficulty. The thrashing machine, the greatest improvement in the mechanical part of agriculture that has ever been introduced, has been used in the North for nearly 20 years; and this is still, in a great measure, unknown in some of the principal corn counties of England. Turnips and clover, the introduction of which form a new æra in the annals of agriculture, have been known in Norfolk for a century at least, and in other parts of England for half that time, and yet in districts where their chief dependence is stock, they are ignorant of both, or cultivate them in a very partial and careless manner.

There seem to be two circumstances which chiefly operate in rendering agricultural men less inclined to adopt improvements than manufacturing men are. In the first place, as the manufacturers all buy their raw materials at the same, or nearly the same price, and as none of them have any superior or peculiar advantage in working it up, independent of the skill and economy with which they direct their labour, they must either adopt the improvements that are known and followed, or be undersold by their competitors: on the other hand, the price of the land, or the raw material of the farmer, varies much in different parts of the kingdom; and this variation in price will appear still greater, when we consider that the price is generally lowest where the climate, which operates very powerfully in assisting or superseding the labour of the farmer, is most favourable to agriculture. A farmer with a high-rented farm, and an indifferent climate, is forced to adopt every method of saving labour, and of improving his system, in order to put him upon a level with the farmer who rents a cheaper farm, in a better climate: the latter, on the other hand, having his raw material cheaper, and having the benefit of a superior climate, is not reduced to the necessity of overcoming his prejudices against the adoption of novel practices, in order to put himself on a level with the former.

But in the second place, there is a circumstance peculiar to agriculture, which ought certainly to be the ground of rational objection in some degree, but is too often made the ground of strong prejudice against the introduction of any thing that is new. When a manufacturer hears of any improvement in the mode of working up his raw material, which has been adopted with success in any part of the kingdom, he does not hesitate to introduce it, from any fear that it will not answer equally well with him: his raw material is the same with that on which it has already been tried, and nothing prevents him from applying his labour in the same way: but the farmer hesitates before he introduces a new mode of practice, from the apprehension that what is suitable to one soil and climate, may not be adapted to another. This objection, when stated generally, appears to have a great deal of weight; but when we come to examine it more attentively, we shall find that it is over-rated. No person would think of recommending the implements or practices that are found to answer on a very light soil, to be adopted on a strong soil; or that the system of husbandry that has been followed with success in a moist climate, should be established in a dry climate. But where implements and practices have been established for years with success on a strong soil, with a dry but backward climate, surely there can be no impropriety in recommending them to be adopted in a similar soil, where the climate is equally dry, but much more forward. The presumption is, that the system which has answered where it had to struggle against a cold and ungenial climate, would prove highly beneficial, where it had the co-operation of warm and favourable weather.

As however it is a fact, that the difference of climate, and the alledged difference of soil, are the greatest objections urged against the adopting the implements and practices of other districts, it becomes of importance to consider of some practical mode of removing these objections: reasoning and probability will do little against prejudice, supported by the appearance of concurring facts.

In order to prove that the practice of one district may be advantageously introduced into another, there seems to be but two methods: either that the sons of the farmers in the district which it is wished to improve, should spend a sufficient time in the district already improved; or that the farmers from the latter district, should be encouraged to settle in the former. The latter method seems preferable, if care is taken to select judicious and steady farmers, with a sufficient capital, and with such a knowledge of the world as will enable them to keep their ground, and work their way into the good opinion and confidence of their new neighbours: such persons, with servants who they could depend would not be enticed from them, might by perseverance effect a great deal. A farmer's son, who had been sent into another district, to learn the improved system of it, would on his return meet with less prejudice than a mere stranger; but in some other respects, he would not be so eligible.

There can be little doubt, that the judicious and gradual adoption of both these methods, would soon put the agriculture of the kingdom more upon a footing with regard to skill and produce: at present, no one can deny that, allowing every thing which prejudice would contend for on the score of difference of soil and climate, some districts are much worse farmed than others; the great object therefore should be, to bring them as nearly to an equality as difference of soil and climate would admit.

That part of the cultivated land in Surrey which we are now considering, is equal in point of climate, and certainly not inferior in point of soil, to any district of similar extent in England; it has great advantages from its vicinity to London, and to inexhaustible stores of chalk and lime; and yet it is certainly inferior to several districts, by no means equal to it in climate, and not superior to it in soil, in the economical application of labour—in a regular system of judicious cropping—and in the produce that it yields. That system which has improved the poor sandy soil of Norfolk, and the cold wet clays of Essex, and which has overcome the obstacles which the comparatively backward and unsettled climate of Northumberland, Berwickshire, and East Lothian, oppose to the industry and skill of the farmer, would certainly be highly advantageous in Surrey. Had that system been found to answer only in a confined district, and on a particular soil, the objection to its introduction would have been valid: but we must suppose something very peculiar in the soil and climate of Surrey, if they are not adapted to that system of agriculture which has been found to answer over the counties of Essex, Suffolk, Norfolk, and Northumberland, in England; and over the whole eastern side of Scotland, from the Tweed to Aberdeen.

With respect to the Weald, however farmers may differ as to the mode of improving it, all must agree, that few districts require a complete change of system more than it does. To the eye, when viewed at a distance from the Surrey Downs, it presents the appearance of a fertile and rich country; but to those who enter it, the appearance is very different. In other parts of Surrey, tracts may be met with, considerably behind the rest of the county in spirited and skilful improvement, and in an active and intelligent class of cultivators; but these tracts are few in number, and small in extent: they are, moreover, surrounded with a better cultivated district, and they have every appearance and prospect of gradually becoming like it: but in the Weald, there is scarcely a vestige of improvement in any part of it: it seems quite impenetrable to that spirit and skill which are operating in the other parts of the county. Every thing in it wears the look of inadequate capital and labour, or of capital and labour misapplied.

On examination, the unproductive state of the Weald will be found to arise, not so much from ignorance and inattention in the following up a particular plan of management,

nagement, as from a radical defect in the plan itself; or at least, from the existence of such obstacles to the carrying on that plan, as must render of little effect the most constant and watchful labour, and a much greater degree of skill and capital than the Weald farmers possess.

The improvement of the whole Weald, or Vale district, comprehending that part which lies in Sussex, as well as that which lies in Surrey, has been treated of in general with so much judgment and good sense by Mr. Marshall, that it may be proper to give his plans in the first place, and afterwards to offer a few remarks on one or two parts, in which his views appear to be of doubtful utility.

"It has been shewn, in speaking of the roads of this district, that a want of facility in the work of carriage is a great bar to its improvement, rendering the labour of bringing in manure and carrying out produce, difficult and expensive.

"But in a low, flat, deep-soiled country, destitute, in a manner, of roads, and of materials to form them with, water-carriage aptly presents itself.

"In 1791, the navigation of the Arun had then recently been extended to Newbridge, below the junction of its two principal branches near the village of Green, towards the centre of the Sussex part of the Weald. What appeared to be wanting, was a farther extension to Horsham, either by the windings of the eastern branch of the Arun, or across the more central parts of the Vale, by Billinghurst; and from Horsham, through the Surrey part of the Weald, to the chalk-quarries of Betchworth, and down the valley of the Mole to the market of Dorking.

"The western branch of the Arun presents another line of extension, equally obvious: to pass through the north-western quarter of the Vale to Godalming, there to join the Wey navigation; thus opening a navigable communication between the Thames and the English Channel.

"By means of such easy communication, the entire Vale might be supplied with manure, and its products of corn and timber be carried off, at a moderate expense, to the best markets, besides furnishing a favourable opportunity of bringing road materials into the interior of the district.

"Since 1791, the Earl of Egremont, whose patriotism and benevolence flow in every direction, has made the Rother, which falls into the Arun near Arundel, navigable to Midhurst; and has it in view to conduct a canal from the Rother navigation, by Petworth, and along the western margin of the Weald, to Godalming. This would render the water-carriage of the Weald still more complete.

"The probable improvements that have occurred to me, in traversing the vale lands now under view, respecting roads, are of a fourfold kind, according to the intention of the given road, and the degree of improvement required to answer that intention.

"The present flat lanes are improvable by two obvious means, without changing the form of their surfaces. These are, by doing away the dangerous quick springs, which frequently occur on the bangs of hills, by means of under-drains; and removing the deeper sloughs that occur in the bottoms, by means of trunks or arches, to convey the surface-water to the nearest drain or ditch.

"The next stage of improvement would be, to gather up a wide ridge or barrel road, along the middle of the lane, with the plough; raising it sufficiently at the crown to shoot off rain-water, and smoothing the surface from time to time, especially in the spring, with the harrow and roller: thus obtaining, at a small expense, an easy summer road for carriages.

"The third stage, appears to be that of running a waggon-path along the middle of the ploughed ridge or barrel, with dilatations, or double paths, at the bends of the road, or in the most conspicuous and convenient places, for carriages to pass each other; and with lines of posts on either side, to confine them to the path.

"For the more public roads, a firm solid pathway, seven or eight feet wide, and strong enough to bear laden carriages, would be required. But for private or bye roads, a much less expensive work would be found highly beneficial. The method of forming the simple waggon-paths here recommended, is described in the 'Midland Counties:' they consist of three lines of hard materials; one for each wheel, with one between them for the horses to draw upon.

"Had either of these methods of forming winter roads been adopted, instead of attempting to make at once wide barrel roads of hard materials, fetched perhaps several miles, the very materials that have been buried in the mud, in making these attempts on the outskirts of the district, would have formed sound firm waggon-paths across every part of its area, or at least, along the most public roads.

"The last stage of improvement of the most public roads, would be that of forming wide barrel roads of hard materials, carried from the quarries, or the canals, by means of the waggon-paths, beginning with the parts where they were found to be most wanted; thus advancing progressively from the lowest to the highest degree of improvement, without taking one step in vain.

"Another public improvement by which the Weald might profit, is that of enclosing the commonable lands which now occupy no inconsiderable portion of its surface, and which are mostly of a quality that will make ample returns for the expenses of enclosing and cultivation.

"And another, which is more or less requisite in every vale district, is a commission of sewers, with inquests in the several parishes or districts which it comprises, so as to remove every unnecessary obstruction to running waters; and thereby give each individual an opportunity of freeing his land, in the shortest and speediest manner, from superfluous moisture.

"The private improvements of which the Weald is evidently capable, are numerous and great—exceeding, I think, those of any cultivated district I have examined. Indeed it appears to me, that a total change of the general economy of the district is requisite to its greatest improvement, namely, that of converting the principal part of its arable enclosures to pasture and woodlands; and its pastured commons, or the more valuable parts of them, to arable enclosures.

"To convey my ideas with respect to the enclosed lands in the clearest manner I am able, it will be requisite to divide them into three classes, namely:

"The deeper, better soils, which require only *cleaning*, to render them fit to be converted to a state of perennial herbage.

"The soils that require to be *deepened*, before they can be properly brought to that state. And,

"The *weak unproductive lands*, that have been mentioned, as having been cleared from the state of woodland by mistake, or through circumstances that do not now exist.

"The broad basis on which the success of laying, turfing, or grassing arable lands, chiefly depends, is that of cleansing the soil from weeds through the means of *tillage;* which, at the same time, by exposing it to the atmosphere, will render it friable, and every way fit to encourage the tender fibrils of infant herbage.

"The choice of herbage depends on the nature of the land. The greater the number of distinct species, provided they are of valuable quality, the better chance there is of quickly obtaining a close turf in every season of the year. What I should recommend for the Weald, would be a small quantity, as one to two gallons, of clean winnowed ray-grass; a similar quantity of the meadow soft grass *(holcus lanatus)* or Yorkshire hay-seeds; and of the dwarf poa or meadow-grass *(poa annua)*, or Suffolk grass; with a like portion of the meadow or tall fescue *(festuca elatior)*, if the seeds of it can be procured; also, three to six pounds of white clover, with similar quantities of trefoil and rib-grass *(plantago lanceolata)*, all of which are to be had at the shops. And besides these, a man who has industry and the spirit of enterprise in his composition, would collect and cultivate such species of valuable herbage, as he sees flourishing on the best pieces of the few old grass lands now to be found in the Weald, and add their seeds to the mixture, even though the quantity were small: for if the soil and situation should prove grateful to them, as doubtless they would, their increase would be certain; while those whose seeds were sown in greater quantities, would dwindle and give place to them. The chief thing to be desired, seems to be that of supplying the land with a variety of species, in order that such as are best suited to the soil and situation, may have a fair opportunity of gaining a footing, and this can never be done with so good effect as in the first instance, when the soil is wholly unoccupied, and when each has a fair chance to establish itself.

"To do equal justice to the several species, the manures which are used for young herbage, should either be spread on the surface, or be mixed evenly with the soil, and ought not to be buried with the last ploughing for the crop. For in this case, the strong, deep-rooting plants, gain an advantage, and a great art in producing perennial herbage, is to encourage the finer grasses, without which a close turf cannot be obtained.

"With the same view the young plants should be kept closely pastured until the tender species are fully established. One crop of hay, by encouraging the strong plants, and smothering or checking the weaker species, is capable of doing irreparable injury for years to come, according to the size of the crop and the age at which it is cut. Pasturing close with sheep from the time of the first shoot in early spring, and with the same or heavier stock (after the land will bear them) throughout the summer, during the first three years, appears to me, from many instances of experience, and numberless of observation, essential to common good management.

"The proper stock for such young grass grounds, on the tender moist lands of the Weald, would be ewes and lambs, to be fatted in the course of the summer.

"At the end of three years, or whenever the required sward shall be fully established, the dairy appears to be the most natural object to be pursued on a large scale, on the cool moist lands under notice, which resemble in soil and situation, the best cheese lands of Gloucestershire and North Wiltshire so nearly, that there can be little doubt of their eligibility in that intention.

"The *second class* of the Weald lands are by far the most difficult to improve. Their present unproductiveness appears to be owing chiefly to a closeness of texture, and a want of depth in the cultivated mould.

"That tillage, properly conducted and long enough pursued, would go a considerable way towards removing those evils, there is little doubt. Lime applied to the fresh raised soil, and any gross vegetable produce, ploughed under, would greatly assist. If by any easy process, part of the soil could be burnt and spread over and mixed with the rest, it is highly probable the whole might be thereby meliorated.

"The improvement of the *third class* of Weald lands is obvious and easy. Clean the soil by a fallow broken up in autumn, or early winter, and sow it the ensuing autumn with acorns, ashen keys, or any other seeds of trees more desirable, with or without a crop of corn. Fence securely, and leave the rest to nature, until the plants require thinning. The success of this summary way of propagating woodlands, is seen in the practice of Warwickshire, in the 'Midland Counties.'

"The right management of the *common lands* appears to me equally obvious. Such as are too weak for corn or profitable herbage, enclose securely: cut down the brushwood, if any, and plant tree seeds in the vacancies. The rest bring into a course of arable management as fast as propriety will allow: for having never produced corn, they would doubtless continue to throw out, under judicious management, abundant crops for many years. Where trees or strong bushes abound, cut them off within the surface, and let the land remain in a state of grass until they be decayed.

"These observations on the improvement of the Weald, are the fuller, as they are applicable not to this particular district only, but more or less to every vale country. I bring them forward here, because many of them actually rose in examining the lands that are the present subject of discussion; and there is no other district in the island to which the remarks here offered, can be so fully applied. I am of opinion, that were the alterations here proposed, judiciously carried into effect, the rental value of the lands would be nearly doubled; and this at a small expense, compared with the greatness of the improvement*."

It would not be an easy matter to suggest any very material addition to the plan of improvement here laid down, so far as it respects the making of canals and roads; the choice of herbage for pasture, and the management of the pasture while it is young, and the whole plan for improving the Weald lands of the second and third class. But it may be doubted, whether the Weald lands of the first quality would pay so well under permanent pasture, as under a judicious rotation of pasture and tillage: that they would be greatly benefited in their present exhausted and neglected state, in being well laid down to grass for some years, there can be no doubt; nay, as has been already remarked, with regard to the exhausted and ill cropped lands in the other parts of the county, laying them down to grass is the most effectual method of restoring them.

---

* Marshall's Southern Counties, ii. p. 152-164.

But the experience of many parts of England, where the value and produce of land under permanent pasture, and of land under a judicious mixture of white and green crops, or of land which has been suffered to lie in grass only for a few years, have been carefully compared, seems to prove, that except in particular circumstances, the mixed husbandry keeps the ground in the best condition, and pays the farmer and the community the best. Mr. Marshall observes, that the Weald lands of the first class are similar in soil and situation to the best cheese lands of Gloucestershire and North Wiltshire; but in choosing land for permanent pasture, climate ought to be regarded more than soil or situation. In a moist climate, pasture will certainly answer better than tillage; but in a dry climate, on the contrary, tillage is the most suitable. It may be urged, that the soil of the Weald is moist: it is so undoubtedly, but so far as regards the nature and value of the pasture, there is a great difference between a soil which is rendered moist by the wetness of the climate, and a soil which is kept moist in a dry climate by its retentive nature. Whatever similarity there may be between the soil of the Weald and that of Gloucestershire cheese land, there is certainly a considerable difference in point of climate between the two districts: and the peculiar value of the Gloucestershire cheese land probably arises as that of the Cheshire cheese land certainly does, from the moisture of the climate, rather than from the retentive nature of the soil.

In another place Mr. Marshall mentions the fine turf that is to be seen in the lanes of the Weald, as a proof how well this district is suited for permanent pasture. But it should be recollected, that the turf in the lanes is kept much drier by the ditches on the sides of them, than large fields could possibly be kept; and that it is richly and constantly manured by the dung of the cattle and horses, and by its own annual decay.

Few soils pay better under the mixed husbandry, than strong, good clays, such as compose the Weald lands of the first class; and there can be little doubt, that if the proprietors would confine the wood to the inferior soils and the higher spots, and would give the encouragement of long and open leases, and good roads, to tenants of sufficient skill and capital, the latter would soon, by the intervention and assistance of a few years of pasture well laid down, raise large crops of corn.

With regard to the improvement of the extensive heaths in the west and south-west of the county, the result of some trials (which have been already noticed), of planting them with larch and Scotch fir, has been so very favourable, that this application of them promises to be of the most advantage: parts of them might indeed be converted into rabbit-warrens, or formed into fish-ponds: but as neither of these could be carried to a great extent, planting them should be regarded as the essential object. It is well remarked by Mr. Marshall, that "there is not a sounder position in rural or in political economy, than that wood should be confined as much as possible to *unculturable* lands, either as being too steep, too rocky, too bleak, or too barren, to bear profitable crops of corn or herbage."

Though the picturesque beauty and rich appearance of the county of Surrey, would certainly be much impaired by transferring the timber from the hedge-rows, and from the vale lands, to the poor clays and the sandy heaths, there can be no doubt that this change would greatly benefit its agriculture, and at the same time be highly advantageous to the interest of the landholder, and to the country at large.

The prospect of the improvement of the agriculture of Surrey, is in one point of view extremely favourable, while in another point of view it is not so flattering: the prejudices that were formerly entertained against the introduction, first, of the South Down sheep, and afterwards of the Merino, are fast wearing away: indeed, the prejudice against the former may be said to have yielded entirely to an experimental conviction of their superior profit and advantages: yet it is not very long since the South Down were regarded as unsuitable for the Surrey hills: a few years will probably remove entirely the prejudice against the Merino sheep. Yet while the Surrey farmers are introducing the *stock* of other districts, they seem averse to adopt the implements and arable practices even of those counties, which they acknowledge are before hand with them in these respects: and they make use of the same arguments that were formerly advanced against a change in the breed and management of stock; that though such things might do very well in other districts, yet they would not answer in Surrey. At first sight, we should expect that such farmers as were willing to change their system in one point, would not be very averse to a change in another; and yet it certainly is the case, not merely in Surrey, but in many other parts of the kingdom, that while the stock has been improving, and while the farmers have been zealous in favouring and adopting these improvements, in the very same districts the arable husbandry has remained nearly unchanged for a number of years, and the farmers lend a prejudiced ear to any alteration in it.

As, however, the Surrey farmers are now beginning to see the good effects resulting from a change in the system of cropping their ground, and to be convinced that the alternation of green and white crops ought to be a fundamental rule in farming, we may hope, that in the course of a few years, the more enlightened and spirited of them will introduce all the improvements in the arable husbandry of the best cultivated districts, with the same zeal and perseverance with which they have adopted and encouraged the improvements in stock, and in the general system of cropping their land.

Digitized by Google

# INDEX.

A

ACRES in Surrey, page 3.
——— employed in raising vegetables for the London market, 416.
——— computed, of heaths, commons, and common-fields, 477.
Agriculture, number of people employed in, 571.
Anniseed, 379.
Apples, remarks on the failure of the old sorts of, 420.
Ash, 444.
Ashes, quantity got from an acre by paring and burning, 499.
——— used as manure, 506.

B

Bagging wheat, 215.
Barking oak, 441.
Baptisms and burials from 1700 to 1800, 575.
Barley, Section on, 221.
——— remarks on the Surrey mode of harvesting, 224.
Beans, Section on, 233.
——— remarks on the culture of, in Surrey, 236.
Birkbeck's, Mr., mode of sowing clover-seed, 304.
——— remarks on laying land to grass, 395.
——— on paring and burning grass land, 408.
——— on his Anglo-Merino sheep, 528.
Beech, 442.
Births and burials, Mr. Lysons' tables of, 578.
Blackheath hundred, villages, &c. in, 5.
Boundaries of Surrey, 1.
Box, 445.
Breaking up grass land, 407.
Brick-earth in Surrey, 58.
Brixton hundred, villages, &c. in, 6.
Buck-wheat, sown with sainfoin, 240.
——— application of, 241.

C

Calves, rearing, mode, expense, and profit of, 521.
Canals, Section on, 557.
Cattle, Section on, 519.
——— fattening at the distilleries, 522.

Carts, single-horse, and waggons compared, 138.
Cabbages, Section on, 269.
Carrots, Section on, 279.
——— where cultivated, 280.
——— hoeing, mode and expense of, 284.
——— taking up, mode and expense of, 285.
——— merchants for the sale of, 287.
——— consumption of, 288.
——— drilled, 289.
Chalk soils in Surrey, 34, 38.
—— pits, 497.
—— use of, as a manure, 497.
Chamomile, 378.
Charcoal for gunpowder, 431.
Chertsey hundred, villages, &c. in, 7.
Clay, remarks on the different kinds of, in Surrey, 21.
—— winter-ploughing, advantages and disadvantages of, 171.
Climate of Surrey, 17.
Clover, Section on, 303.
——— Mr. Birkbeck's mode of sowing, 304.
——— machine for thrashing, 308.
Coal, tradition respecting, in Surrey, 56.
Copthorn hundred, villages, &c. in, 8.
Cottages, Section on, 82.
Copse-woods, 426.
Commons in Surrey, 460.
Common-fields, 470.
Composts, 514.
Cows, kind of, kept in Surrey, 522.
Croydon, hundred of, villages, &c. in, 9.
———— canal, 559.
Crops, course of, Section on the, 178.
——————— principles on which regulated, 179.
——————— followed on the different soils, 186, 190.
——————————— in the Weald, 193.
Curl in potatoes, remarks on the, 297.

D

Deaths, number of, in each hundred in 1801, 577.
Dill (species of lentil), 239.
Divisions of Surrey, 3.
Downs of Surrey, 34, 40, 480.
——— inquiry into the advantage of breaking up the, 482.

Dorking

Dorking hundred, villages, &c. in, 10.
——— fowls, 538.
Drill husbandry in Surrey, 157.
——— on the proper use of the, 158.
Draining, Section on, 483.
——— expense of, 486.
——— new mode recommended, 487.
Dung, town, 509.
——— yard, 511.

E

Elm, 444.
Enclosing, Chapter on, 142.
——— rise of rent and increase of produce from, 144.
——— expense of, 143.
Estates, management of, Section on, 73.
——— general size of, 73.
Expense and Profit, Section on, 107.

F

Farm-houses and Offices, 78.
Farms, size of, 84.
Farmers, character of the, 88.
Fallowing, remarks on the necessity and advantage of, 164.
——— present mode of, in Surrey, 169, 175.
——— former mode, 171.
Farnham, hundred of, villages, &c. in, 11.
——— hop culture, 328.
——— on the quality of the, 371.
Faggots, 434.
Fairs in Surrey, 560.
Fish, refuse, effects of, as a manure, 506.
Fir, 449.
Firestone, quarries of, 53.
Fire-brick earth at Nonsuch, 58.
Flax, Section on, 374.
Folding sheep, 532.
Fullers'-earth, 50.
Furrows, mode of striking, 163.
Furze, 453.

G

Gardens, Section on, 414.
Garden ground near London, 418.
Godalming hundred, villages, &c. in, 12.
Grass land, different proportion of, in Middlesex and Surrey, 385.

Grass, Laying Land to, Section on, 393.
——— Mr. Birkbeck's remarks on, 395.
——— points to be attended to in, 404.
Grasses most generally used in laying down land, 408.
Grass land, breaking up, 407.
Gypsum, 503.
Green crops injudiciously used in Surrey, 182.
——— ploughed in, 509.
Guildford Canal, 557.
Grand Surrey Canal, 558.

H

Harrows used in Surrey, 132.
Harrowing, remarks on, 153.
Hazel loams in Surrey, 33.
Heathy soils in Surrey, 38, 457.
Hall's, Mr., machine for freeing wheat from smut, 141.
Hare-warren, 539.
Healthiness of Surrey, 582.
Hoeing, hand, 162.
Hoops, woods used for, price of, loads off an acre, 430.
Horses, Section on, 536.
Houses of Proprietors, 77.
——— farm, 78.
Hops, Section on, 325.
——— when first introduced near Farnham, 326.
——— soil proper for, 328.
——— preparation for, 335.
——— mode of planting, 339.
——— sorts cultivated near Farnham, 341.
——— management of, 343, 345.
——— Poling, 346, 350.
——— distempers incident to, 355.
——— picking, 360.
——— kilns for drying, 362.
——— expense, profit, and produce of, 365, 368.
——— on the quality of the Farnham, 371.
Hogs, Section on, 357.
Horizontal windmill, 565.
Hundreds of Surrey, 4.

I

Improvements required in Surrey agriculture, 586.
——— means of introducing, 590.
——— necessary in the Weald, 595.

Inhabitants,

Inhabitants, number of, in Surrey, 571.
Iron ore, 49.
Irrigation, 516.

K

Kingston hundred, villages, &c. in, 13.

L

Labour, Section on, 540.
Larch, 448.
Lavender, 378.
Land-tax, 4.
Lambs, house, 533.
——— grass, 535.
Leases, Section on, 98.
Leith Hill, view from, 47.
Lester's, Mr., thrashing machine recommended, 135.
Limestone, quarries of, 55.
Lime, mode and expense of burning, 499.
——, used as manure, 501.
Liquorice, 380.
Loams in Surrey, 32.
Lucern, 323.
Lysons', Mr., tables of population, 572, 574.
————, comparative tables of births and burials, 578.

M

Manufactures, Section on, 563.
Marshall, Mr., on the improvement of the Weald, 596.
Meadows, Section on, 389.
————, rent of, 391.
————, on the Mole and Wey, 390.
Manuring, Section on, 494.
Manures, rules followed in forming, 495.
Merino sheep, 528.
Minerals, Section on, 49.
Mineral waters, 71.
Mole, account of the rise, course, sinking, &c. of the, 62.

O

Oak, 438.
Oats, Section on, 226.
Orchards, Section on, 419.
Ozier, 442.

P

Paring and burning grass land, Mr. Birkbeck on, 408.
———————— new enclosures, 488.

Parsnips,

Parsnips, 291.
Pastures, Section on, 391.
Peat ashes, used as manure, 507.
Pease, Section on, 230.
Pennington's, Mr., mode of feeding his horses, 238.
Peppermint, 376.
Physical herbs, Section on, 376.
Pisè Walls, 144.
Plantations, Chapter on, 424.
Ploughs used in Surrey, 116.
——————, remarks on, 123.
Ploughing deep, remarks on, 149.
Ponds, fish, in Surrey, 70.
Poles for hops, 346, 433.
Potatoes, Section on, 291.
——, rabbits' waste used as manure for, 292.
——, remarks on the management of, in Surrey, 300.
Property, state of, Chapter on, 73.
Poppy, 381.
Poultry, Section on, 528.
Prices of piece-work, 543.
Poor-rates, Section on, 96.
Poor, maintenance of the, 567.
Population of Surrey, Section on the, 571.

Q

Quicks, improvement in the mode of setting, 144.

R

Rape, Section on, 266.
——, mode of feeding off, followed by Mr. Birkbeck, 268.
Rabbits'-waste used as manure for potatoes, 292.
Ray-grass, 310.
Rail-way iron, 553.
Richmond Hill, view from, 45.
Riegate hundred, villages, &c. in, 13.
Ridges, usual breadth of, in Surrey, 154.
——, remarks on narrow, 155.
Roads, 546.
——, expense attending, 548.
Rotations usually followed, 178.
Rye, 221.

S

Salisbury's, Mr., remarks on the Siberian turnip, 278.
Sandy loams in Surrey, 36.

Sainfoin, Section on, 311.
———, soil fit for, 312.
———, on sowing trefoil along with, 314.
———, on drilling, 317.
———, mode of making into hay, 319.
———, remarks on its supposed exhaustion of the land, 322
Scuffler described, 134.
Sheep, Section on, 526.
———, different kinds of, in Surrey, 527.
———, Mr. Birkbeck on his Anglo Merino, 528.
———, food, 531.
———, folding, 532.
Servants, character of, in Surrey, 541.
———, wages, 542.
Siberian turnips, 278.
Size, absolute and relative, of Surrey, 3.
Smut, machine for taking out, 141.
——, on the cause and cure of, 217.
Sowing, trough and sheet compared, 140.
Soil, Section on, 19.
Springs in Surrey, 70.
St. Anne's Hill, view from, 43.
St. George's Hill, view from, 44.
Straw, proportion of, to corn, 217.
Stubble, turnips, 265.
Soot, used as manure, 507.
Stables, improper construction of, 80.
Subsoils in Surrey, 31, 33, 34, 36.
Surrey Canal, 558.
Surface of the county, 42.
Swedish turnip, Section on, 272.
———— compared with turnips, 276.

T

Tanridge hundred, villages, &c. in, 14.
Tares, Section on, 237.
—— used for horses, 238.
Thrashing mills, 134.
————, Mr. Lester's recommended, 135.
Tithe, Section on, 92.
Tillage, Section on, 147.
Trefoil, used as sheep feed, 310.
——— sown with sainfoin, 314.

Turnips, when introduced into Surrey, 242.
——, remarks on the comparative advantages of drilled and broadcast, 249.
——, value and price of, 264.
——, stubble, 265.
——, not sufficiently used for fattening cattle, 524.
——, Swedish, 272.
——, Siberian, 278.

W

Wages of Farm servants, 542.
Wandle river, account of the, 68.
Water, Section on, 59.
Waggons and single horse carts compared, 138.
Walnut, 443.
Weston, Sir Richard, Surrey husbandry indebted to, 242, 303, 310, 516, 557.
Weald of Surrey, 24.
——, woods in, 424, 437.
——, improvement of the, 595.
Weeding, 162.
Wey river, rise, course, &c. of the, 60.
Wheat, Section on, 202.
——, sorts of, 208.
——, harvesting, 215.
——, distempers of, 217.
Wheel-ploughs, evils and disadvantages of, 128.
Winds prevalent in Surrey, 17.
Winnowing machines, 139.
Windmill, horizontal, 565.
Woad, 383.
Woking hundred, villages, &c. in, 15.
Wormwood, 378.
Woods, Chapter on, 424.
Work, hours of, 544.

Y

Yew, 447.
Yoking horses in a plough, remarks on, 151.

PALATINO Napoli

THE END.

547004

London: Printed by B. M'Millan,
Bow Street, Covent Garden.

Digitized by Google

Digitized by Google

Digitized by Google

Digitized by Google